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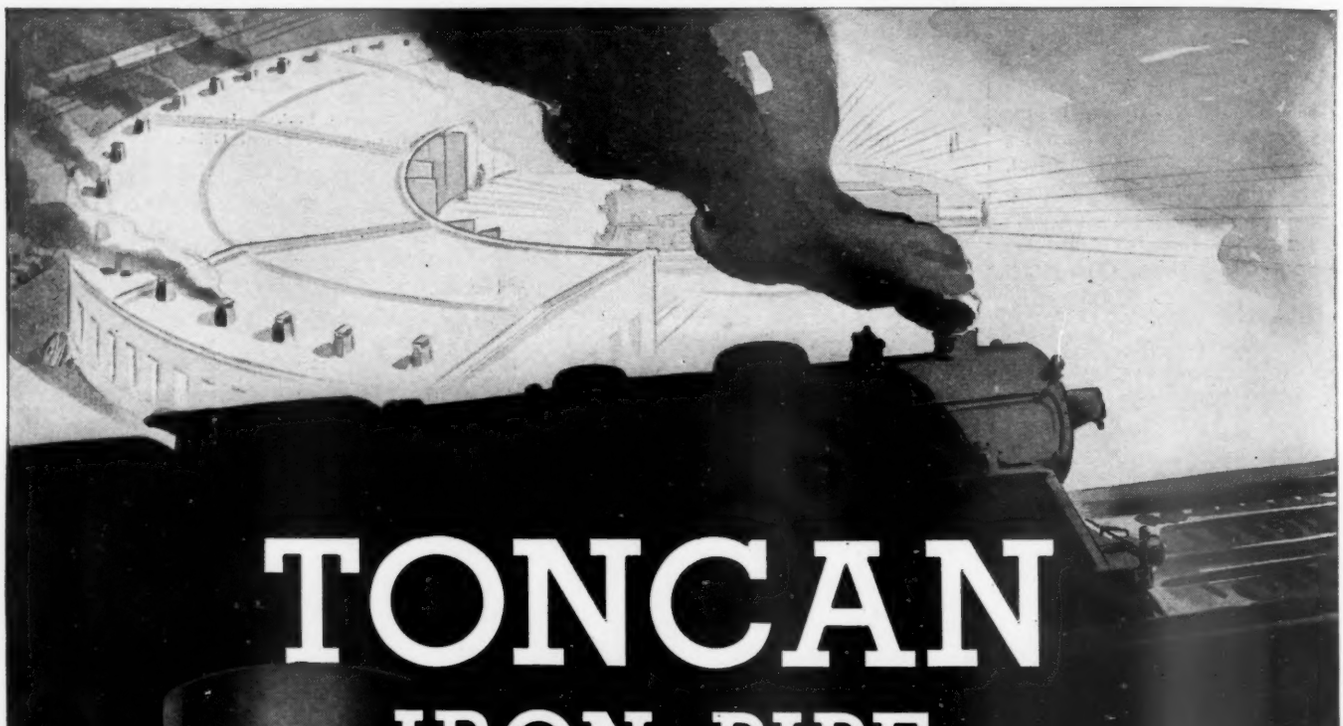

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"Chiseling" Aided by Government in Transportation

The policy of the federal government in dealing with business in general presents a striking contrast with the utter negation of that policy which it and the states have thus far pursued in their treatment of transportation. Business in general is being encouraged, wheedled and coerced by the federal government to come under codes of fair competition whereby all competitors are required to maintain the same minimum wages and hours of labor for their employees and otherwise refrain from sharp and unsocial practices, known in governmental terminology as "Chiseling."

Codes Sanction Low Standards

In transportation, on the other hand, "chiseling" is still the order of the day with the sanction and support of both government regulation and government subsidies. The big transportation companies—the railroads—are subject to regulation more stringent and detailed than that applied to any other business. Their highway and waterway competitors are, theoretically at least, operating under NRA codes. But these codes, ineffective as they are in operation, even on their face make no pretense of establishing equal competitive conditions throughout the transportation industry. Instead the codes, even if they were observed, permit those operating under them to pay wages to their transportation employees which are only a fraction of the wages paid by the railroads to employees doing similar work. By approving codes for one part of the transportation industry which established much lower standards than those already strictly enforced upon the larger transportation companies, the government, in effect, set its seal of approval upon the very "chiseling" in transportation which it is striving so determinedly to expel from business in general.

Nor does the strange lack of interest thus far shown by the government in fair competition in transportation—so strikingly negativing its general policy—stop with permitting wages and working conditions to the chiselers which are lower than those of the greater part of the industry. It goes much farther. By building highways for which no charge commensurate with their value is levied upon the users, and by developing costly waterways which are made available to users without any charge whatsoever, the government is making almost intolerable the position of that part of the transportation industry which does pay its own way, which does pay fair wages and which does submit to the highest standards of regulation in the public interest.

As a broad economic matter, the nation has a choice between free competition in industry enforced by the Sherman anti-trust law, and regulated competition such as is contemplated by the National Industrial Recovery Act. Free competition in transportation gave rise to such difficulties that, almost fifty years ago, the government began restricting it. The restrictions were made more rigid as time went on—so rigid, in fact, that regulatory authorities encroached far upon the prerogatives of management. After the war, however, partly through technical and engineering development, but more importantly by the lavish expenditure of taxpayers' money on highways and waterways, new forms of transportation were developed and old forms revived, which grew rapidly in importance as transportation agencies. But the language of all these regulatory statutes referred only to the railroads, since, at the time of their passage, the railroads were the only form of transportation generally available.

Evils of Fifty Years Ago Return

These unregulated and unstandardized agencies, fostered by the ever-increasing expenditure of public funds, increased their participation in the total transportation business of the nation so far in the 'Twenties that it became evident that transportation regulation which did not include them was no longer effective regulation in any sense of the word. Railroad regulation was instituted in the first place, not primarily to restrain monopoly, but to eliminate the evils of unrestrained competition. With the development of unregulated high-

way and waterway transportation all these old evils returned. For at least three or four years it has been obvious that railroad regulation cannot be maintained, without wrecking the railroads, unless other forms of transportation are subjected to similar restraints.

Faced with such a situation in a major industry, if the nation had been strongly committed to a return to *laissez faire,* it might conceivably have decided to meet it by removing all restraints from the railroads and letting the transportation industry fight out its competitive battle without interference. But the nation was not committed to *laissez faire.* Quite on the contrary, it was about to embark upon a program of regulation of all industry such as was never before known. Is it not anomalous that, in this program for general control of industry by the government, the one industry should be omitted for which such control is so necessary that it was undertaken almost fifty years ago?

Why Regulate Transportation?

The *Railway Age* is not a partisan either for or against government regulation as a general concept. Some industries, by their nature, undoubtedly require it for their own protection or for that of their patrons. Many others—probably most others—and their customers do not need it, at least not in normal times. But if there is any industry whatever which requires regulation, it is transportation. Business cannot be carried on at a reasonable margin of profit when transportation costs vary over a wide range. Stable rates which only regulation can assure thus are necessary for the protection of the users of transportation. As for those who provide the service, similar protection is also needed if the business is to be conducted at a profit.

The costs of transportation are largely "joint costs," to use a technical term. That is to say, most of the costs of the service are incurred without any reference to a particular shipment. The direct additional costs of an added shipment of freight to a truck or a train or a barge, which is scheduled to run anyhow, are negligible. Without regulation, there will always be some carrier who will be tempted to take the extra shipment at a nominal price—thus tending to reduce the whole rate structure to a level which will not support the service. Some short-sighted shippers might believe that the maintenance of such ruinous rates would benefit them. But the very economic existence of the nation depends upon reliable transportation service and this certainly cannot be maintained at a rate level which does not reflect the total cost of the service.

As necessary as regulation appears to us to be to the welfare of the transportation industry and its customers, we nevertheless concede that there would be nothing unfair about abolishing it entirely. But it is not only unfair, it is insane, to keep up a pretense of regulation by holding the essential part of the industry defenseless against the inroads of rapidly growing competition, which is permitted to cut rates, to pay low wages and otherwise to "chisel" as it pleases. And then, as if that were not enough, to dole out billions of taxpayers' money to provide facilities for these same chiselers. The policy of the government thus far followed toward transportation is neither regulation nor *laissez faire.* It is a combination of two entirely conflicting policies in which the worst features of each are preserved.

There will be opportunity during the approaching sessions of Congress and the state legislatures to correct this situation—to stop the most destructive and economically harmful "chiseling" being done in any industry by adopting federal and state legislation to treat all carriers alike as respects subsidies and regulation. No legislative action is more needed in the interest of common fairness and economic recovery.

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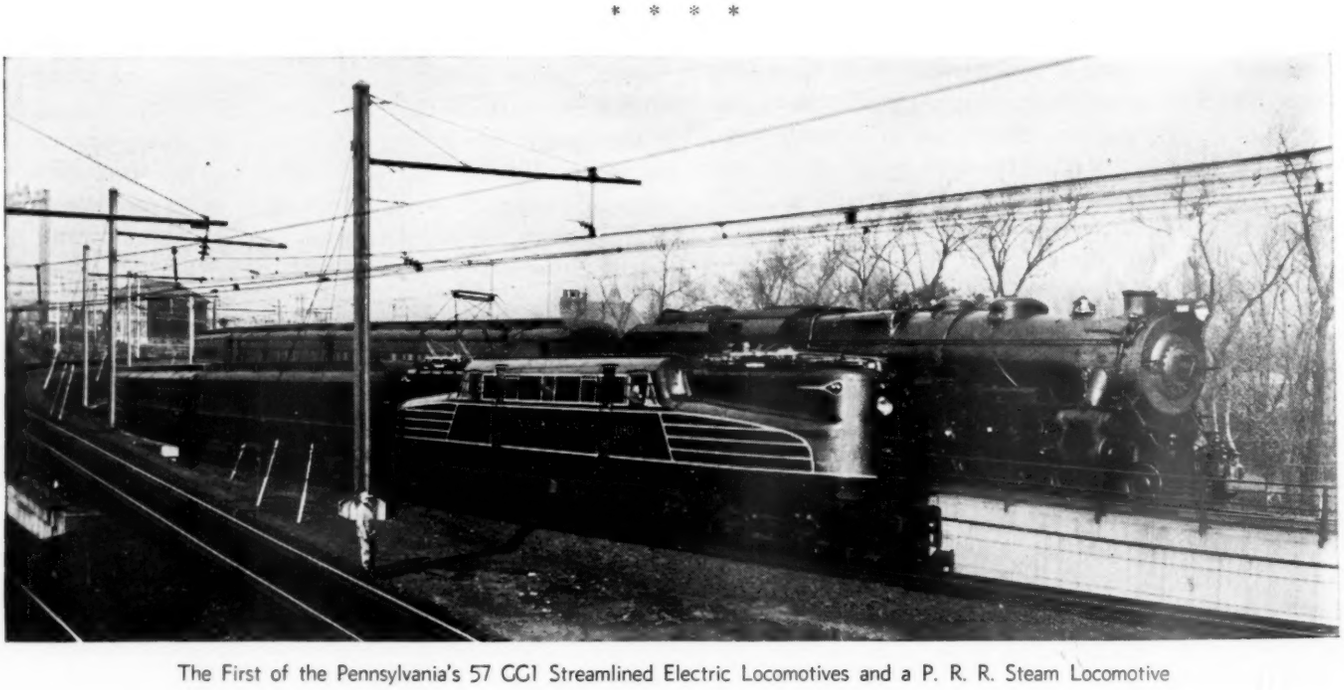

The First of the Pennsylvania's 57 GG1 Streamlined Electric Locomotives and a P. R. R. Steam Locomotive

New Alloy Steels and Their Application to Car Equipment[1]

A description of the characteristics of new materials available for car construction and some of the factors involved in fabrication

By G. N. Schramm,[2] E. S. Taylerson,[3] and Albert F. Stuebing[4]

THE efforts of the railroads to reduce operating and maintenance costs have created a demand for steels embodying combinations of characteristics not heretofore available. The need for materials particularly adapted for use in freight cars found expression in some of the reports of the Committee on Car Construction of the Mechanical Division of the American Railway Association [now the Association of American Railroads], and was further emphasized by the car manufacturers. To obtain the benefit of the suggestions of the car builders and railroads, a questionnaire asking for specifications or characteristics of the type of special steel that would be desirable for car equipment was sent to the principal users of car materials.

The replies to this questionnaire were almost unanimous in suggesting, first, a considerable increase in strength over low or intermediate carbon, open-hearth steel combined with satisfactory forming qualities; second, increased resistance to corrosion, and third, a price which would not add greatly to the total cost of the complete car. Furthermore, it was considered desirable to have a steel meeting the three foregoing requirements which, when formed either hot or cold, would retain adequate physical properties.

An analysis of different steels in production or in process of development indicated that one possessed outstanding qualities. That was a chromium-copper-silicon steel of low carbon content, which has since been produced commercially under the name of Cor-Ten. One of the advantages of this steel is the fact that the excellent physical properties are derived from the alloying elements and it is essentially a non-air-hardening steel. Even rapid cooling from any temperature normally used in fabricating does not produce appreciable hardening. Cold working, however, will develop increased hardness with correspondingly higher yield point and ultimate strength.

The resistance to corrosion of this material, under ordinary conditions, was found to be considerably greater than any other available steels with the exception of the more costly high chromium steels.

To afford a selection of material of high tensile strength, with a smaller price differential over ordinary open hearth steel, it was decided to make available also in forms suitable for car construction two steels which had previously been used in forgings and rolled sections, namely, a medium manganese steel, now produced under the name of Man-Ten and a structural silicon steel, which has been given the name Sil-Ten. These two steels are available with a small percentage of copper, in which case the resistance to atmospheric corrosion is on a par with copper bearing open hearth steel, but lower than that of Cor-Ten.

Table I—Chemical Properties of Low Carbon Steel and of Low Alloy High-Tensile Steels

Chemical composition	Regular open hearth	Cor-Ten	Man-Ten	Sil-Ten
Carbon, per cent, max.	0.10	0.10	0.35	0.40
Manganese, per cent	0.30-0.50	0.10-0.30	1.25-1.70	0.70-0.90
Phosphorus, per cent	0.04 max.	0.10-0.20	0.04 max.	0.04 max.
Sulphur, per cent, max.	0.05	0.05	0.05	0.05
Silicon, per cent.	0.10	0.50-1.00	0.15 min.	0.20-0.30
Copper, per cent (if specified)	0.20	0.30-0.50	0.20	0.20
Chromium, per cent	...	0.50-1.50	...	...
Corrosion resistance (Atmospheric, comparative)	1	4 to 6	1	1
	or 2 to 3 with copper		or 2 to 3 with copper	or 2 to 3 with copper

The chemical composition of Cor-Ten, Man-Ten and Sil-Ten as well as similar data for ordinary and copper steel is shown in Table I, and the physical properties in Table II, for sheets and strip, and Table III, for shapes, plates and bars.

The properties of ordinary open hearth steel, Man-Ten and Sil-Ten are well-known. Since Cor-Ten steel is a new composition, it seems desirable to point out some of the significant features.

Table II—Physical Properties of Low Carbon Steel and of Low Alloy High-Tensile Steels in Sheets and Strip

Physical properties	Regular open-hearth	Cor-Ten	Man-Ten
Yield point, lb. per sq. in.	25,000 min. to 35,000 min.	50,000 min. to 60,000 min.	55,000 min. to 65,000 min.
Tensile strength, lb. per sq. in.	35,000 min. to 50,000 min.	65,000 min. to 75,000 min.	80,000 min. to 90,000 min.
Elongation, per cent in 2 in.	34 to 25	27 to 22	25 to 20

The physical properties of Cor-Ten shown in Table II are values obtained in tests of sheets and other thin sections and represent minimum values. Table III shows values for plates, shapes and bars. The latter may

[1] Paper presented before the Railroad Division at the annual meeting of the American Society of Mechanical Engineers, New York, December 4, 1934.

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show yield points and tensile strengths considerably above the guaranteed minima, depending on size, gage, and rolling practice, still retaining sufficient ductility to provide a satisfactory degree of workability.

Izod tests at -30 deg. F. indicate from 2 to 2½ times the values for Cor-Ten that are obtained with low carbon open hearth steel.

Table III—Physical Properties of Low Carbon Steel and of Low Alloy High-Tensile Steels in Plates, Shapes and Bars

Physical properties	Regular open-hearth	Cor-Ten	Man-Ten	Sil-Ten
Yield point, lb. per sq. in.	0.5 × ten. str.	50,000 min.	55,000 min.	45,000 min.
Tensile strength, lb. per sq. in.	48/58,000 or 50/65,000	65,000 min.	85,000 min.	80/95,000
Elongation, per cent in 2 in.	27 or 25	27	23	24
Endurance limit, lb. per sq. in. (normalized)	25,000	45,000	40,000	....
Modulus of elasticity, lb. per sq. in.	28—30 × 10^6	28—30× 10^6	28—30 × 10^6	....
Izod impact, ft. lb. (normalized)	30	60	40	....
Coefficient of expansion, per deg. F.	6.4 × 10^6	6.7 × 10^6	....	....

Ranges of physical properties are minima and cover possible heat treatments suitable for sheets.

A feature of this steel is the high ratio of the endurance limit to the tensile strength, which is 0.60 to 0.70. This has been consistently shown in several endurance tests and seems to be characteristic of this alloy.

In rivet shearing tests made on ⅝-in. diameter hot-driven rivets in double shear Cor-Ten developed an ultimate average shearing value of 81,500 lb. per sq. in. The ultimate tensile strength of the rods from which the rivets were made was 80,900 lb. per sq. in. Man-Ten rivets developed 89,800 lb. per sq. in. average ultimate shearing strength, the tensile strength of the rods being 97,990 lb. per sq. in. The bearing values per sqaure inch in both cases were more than twice the shearing values.

Since ductile steels in general show a definite relationship between ultimate shearing stress and ultimate tensile stress, it is believed that the rivet shearing value for Cor-Ten may be taken as approximately equal to the ultimate tensile strength and for Man-Ten as 90 per cent of the ultimate tensile strength, with bearing values twice as great in each case.

Experience in the production of Cor-Ten has shown that it can be rolled in general in forms commonly used in car building. The new A.R.A. center sill Z-bar section has been rolled successfully with the web reduced from the standard dimension of $^{13}/_{32}$-in. to a thickness of $^{5}/_{16}$-in., effecting a decrease of 14 per cent in weight.

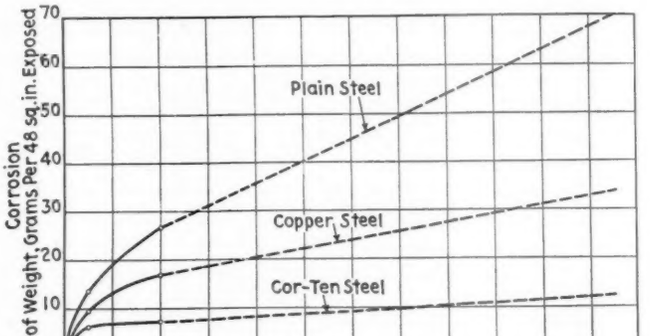
Resistance to Corrosion

Atmospheric corrosion tests of steels were conducted by exposing cleaned and weighed samples, principally sheets, to the action of weather conditions at several typical locations. The amount of corrosion of the different materials was determined by measuring the loss of weight of samples exposed under strictly comparable conditions, which has proved to be the most accurate method. In all the corrosion tests care was taken to compare only those samples which were initially exposed at the same time and for the same period of time at the same location.[5] In some cases steels have been graded according to the time required for corrosion to perforate sheets of the same original thickness, but visual observation of rusted materials may result sometimes in misleading conclusions.

In the development of Cor-Ten and other steels over a period of six years, more than 30,000 samples, comprising about 850 materials in 145 different laboratory and field tests, have been studied.

Representative samples of Cor-Ten and other steels exposed to an industrial atmosphere for more than three years indicate that this steel under the conditions of the test has a resistance to atmospheric corrosion four to six times as great as good plain steel, depending on the quality of the plain steel with which it is compared. Some of the results obtained to date are shown graphically in Fig. 1. It is evident that the units in which corrosion is expressed may be readily converted into other units, such as average depth of penetration. The values remain the same, relatively, regardless of the method of interpreting the data.

Attention is directed to the fact that the corrosion-time relationship of steel is not linear, and that it is not logical, therefore, to assume that the rate of corrosion of steel is the same throughout its period of service. This relationship, which the authors believe has not been pointed out heretofore, has been verified by a study of the curves of hundreds of different kinds of iron and steel.



Annealed, pickled samples exposed on both sides. The extended lines, drawn straight, will become slightly parabolic in all three cases as further data are obtained.

Chart Showing the Corrosion Resistance of Cor-Ten and Other Steels in an Industrial Atmosphere

It will be seen that the period of usefulness of a structure cannot be anticipated from a single set of corrosion observations on samples of the steel used in the structure. It is essential that designers and engineers know the shape of the curve representing the corrosion-time relationship of the material which has been selected for the structure.

The slow, rapidly decreasing rate of corrosion of Cor-Ten in the atmosphere results in a smooth evenly corroded surface. The coating, or rust film, that forms is harder and much more adherent than that which forms on ordinary steels. Severe abrasive action is necessary to remove this dense coating, and after it has been removed the base is found to have been corroded uniformly. This uniformity of corrosion is a definite advantage in car structures.

The increased interest of the railroads in light weight freight car construction emphasized the need for a steel combining greater strength and increased durability. Since the most important corrosion problem of the railroads involves the durability of open top cars, particular

[5] See Schramm, G. N., and Taylerson, E. S., The Influence of Rainfall and Smoke on the Corrosion of Iron and Steel, Corrosion Symposium, American Society for Testing Materials, March, 1934.

attention has been directed to the factors which cause rapid deterioration and to the manner in which Cor-Ten may be applied to this type of equipment. The most suitable way in which a steel may be tested, lacking long time service tests, is by subjecting the material to selected natural corrosive conditions which approach in character those encountered in service. With the thought that the water which seeps through coal in a coal mine is similar to that which seeps through coal in a freight car, samples of many steels were immersed in the acid water of an underground stream. After four months' immersion under these extremely corrosive conditions, Cor-Ten was found to be more than twice as resistant as copper steel and about three times as resistant as good plain steel. Contrary to usual experience, a smooth adherent coating formed on this material. The metal was uniformly attacked; there were no deep pits, furrows or holes as there were in the other steels.

The corrosion of steel cars by coal depends largely on the kind of coal and the length of time coal is stored in the cars, but the corrosion of steel cars in coal service or regular service depends largely on the quality of the steel used in the cars with respect to its resistance to atmospheric corrosion, because cars in normal service are exposed to atmospheric corrosion throughout more than half their normal service life. Careful studies indicate that about 70 to 90 per cent of the corrosion of an average coal car is due to exposure to atmospheric conditions. The superiority of Cor-Ten in the atmosphere, and in running water of an acid nature which had seeped through coal in a mine, indicate that this material should be far more satisfactory for use in cars to be placed in normal service than the steels used at present. Furthermore, since the scale formed on Cor-Ten is of a dense, hard nature and is difficult to remove, and since the characteristics of this steel make it more resistant to abrasion and denting, it is expected that when subjected to the combined corrosive and abrasive action of coal, sand, cinders, etc., it will prove much more serviceable than ordinary open hearth or copper steel. Hopper cars and mine cars constructed of Cor-Ten are now in service.

Cor-Ten is resistant to other corrosive influences. As a means of determining its durability under the combined atmospheric and brine spray conditions which may exist in and around refrigerator cars, icing stations and right-of-way equipment, samples were compared by exposing sheets to an industrial atmosphere at an angle of 5 degrees from the horizontal and spraying them twice weekly with a 10 per cent salt solution. The spraying was applied to both sides of the specimens and was continued each time only long enough to wet the samples. This severe treatment was continued for a period of three months.

The quantitative data obtained under these conditions showed Cor-Ten to be twice as durable as copper steel and almost three times as good as open hearth steel or iron. The rust on all of the ordinary steels had many raised patches which flaked severely during the test, revealing deep pits and holes. The rust that formed on Cor-Ten steel was much smoother and the base was corroded much more uniformly.

Shop Practices for High Tensile Steels

In proposing the application of these special steels in car construction one of the governing considerations was their adaptability for forming cold or hot. The physical properties of all three materials is such that these steels can be bent or pressed cold with only moderate and reasonable changes from the common practice in using low carbon steel. The technique of forming them is slightly changed from that of ordinary carbon steel, consisting principally of making provision for more liberal radius of bend, slightly increased die clearance, and more spring-back of the bend. These features produce no particular difficulties after the shop forces understand how the steels should be worked.

It is natural to expect that these steels, having considerably higher physical properties, even though they retain good ductility, would be stiffer and, therefore, more difficult to bend or press cold. Both Cor-Ten and Man-Ten, however, have been satisfactorily formed as ordinarily required in car building practice. It has been found that for cold flanging to an angle of 90 deg. the radius of the bend with sheets of either of these steels should be at least twice the thickness of the material to insure good results. If plates ¼-in. or more in thickness are to be pressed in the "as rolled" condition, either with or across the direction of rolling, the diameter of the fillet should be three times the thickness of the section. Experience has shown that normalized light plates of Cor-Ten pressed cold do not spring back any more than does ordinary open hearth pressed in the "as rolled" condition.

As regards hot forming operations Cor-Ten may be classed with low carbon steel because it is essentially a non-air-hardening steel, Man-Ten and Sil-Ten, however, have higher carbon content, therefore, normal care must be taken to insure that shop practices are not detrimental to these materials. In hot pressing Cor-Ten the most satisfactory results have been obtained at temperatures of 1,500 deg. to 1,600 deg. F. Man-Ten should be pressed at 1,400 deg. to 1,500 deg. F.

Test pieces cut from the webs of diaphragms, both hot and cold pressed, show a moderate increase in the yield point of the Cor-Ten material, with practically no change in ultimate strength and elongation as compared with test pieces taken from the same sheets before pressing.

Cor-Ten rivets should be driven at temperatures between 1,800 deg. and 1,900 deg. F. At lower temperatures the material is stiffer and more difficult to drive than ordinary open hearth steel.

Electric Arc Welding

Cor-Ten steel can be welded satisfactorily by using any one of several coated carbon steel electrodes. The strength of such welds, properly made, is substantially equal to that of the parent metal, and ductility is ample. There is no evidence of electrolytic action or accelerated corrosion at the junction of the deposited metal and the parent metal.

If it is desired to have the deposited metal of approximately the same composition as the Cor-Ten, this can be accomplished by using electrodes of special composition, which are now available. The results of tests of welds made with such electrodes and also with coated carbon steel electrodes are shown in Table IV.

Punching, Drilling and Reaming

Tests have been made to determine the power consumption and time required for punching, drilling and reaming Cor-Ten and Man-Ten steels in comparison with ordinary open hearth steel. Plates of equal thickness were used in these tests and the same operations were performed on each material.

The punching tests indicated that the costs for Cor-Ten and Man-Ten were practically the same as for ordinary open hearth steel, the only possible variation

being an increase of not over 25 per cent in power consumption and a similar increase in tool maintenance, with no change in time or labor costs.

Tests made by drilling 5/8-in. holes with high speed drills in plates 1/2 in. thick indicate that the actual drilling speed for Man-Ten can be the same as for ordinary open hearth steel, but for Cor-Ten the rate should be reduced about one-third from the maximum permissible with open hearth steel, to insure satisfactory life of drills. In countersinking with manual feed there was no appreciable difference in time or power consumption between ordinary open hearth steel and Cor-Ten, but with Man-Ten the time was 20 per cent less.

Reaming tests were conducted on 1/4-in. plates of the same steels and consisted of enlarging punched holes from 5/8 in. to 3/4 in. and from 3/4 in. to 13/16 in. with a portable electric motor driven reamer. The time required was the same for all three steels but the power consumption when reaming Cor-Ten and Man-Ten was approximately 30 per cent less than when reaming the open hearth steel. This result was contrary to expectations and was therefore carefully checked by a second series of tests, which confirmed the original tests.

A probable explanation of the lower consumption of the high tensile steels was found in the action of the cutters. When reaming Cor-Ten and Man-Ten, the reamers cut a clean chip whereas the softer open hearth steel seemed to deform and cause a frictional drag on the cutter.

The reaming tests demonstrated that Cor-Ten and Man-Ten can be reamed with no increase in labor cost as compared with open hearth steel and with lower consumption. The reamers used in the Man-Ten steel showed slight discoloration at the point, and it was thought that in production, reamers used in this material might require redressing at slightly shorter intervals.

Deductions drawn from these tests indicate that, because of the decrease weight and thickness of parts made of Cor-Ten or Man-Ten as compared with ordinary steel, there would be little, if any, increase in the total labor costs in building cars of the high tensile steels.

Cars Constructed of High Tensile Steels

Baltimore & Ohio Freight Cars.—The first cars constructed of Cor-Ten steel were built by the Baltimore & Ohio in its Mt. Clare shops. These included a hopper car, railroad class N-29, with center hoppers and end hoppers, a hopper car, class N-30, with center hoppers only, and a box car, class M-48.

All three designs have been provided with a cushion center sill separate from the underframe, with long travel draft gear interposed between the center sill and the car body. This construction was used by the engineers and designers of the railroad company with the thought that it would reduce the forces exerted on the car body in buffing and pulling. The severe impacts which occur in freight service cause the actual stresses in the car body to increase by an indeterminate amount over the calculated static stresses and this increase will be less as the end forces due to impact are decreased.

The trucks used on these cars have sideframes and bolsters of heat-treated alloy steel castings and one-wear rolled steel wheels. The hopper car trucks, with 5 1/2-in. by 10-in. journals, weigh 6,760 lb. each, while the trucks for the box car, with 5-in. by 9-in. journals weigh 6,550 lb.

Both hopper cars have bodies in which the sides function as the principal load-carrying members. The top chords are of 1/8-in. plate with a pressed reinforcement of 3/16-in. plate. The side sill, which forms the bottom chord, is of 1/8-in. plate, pressed to a Z-section. The side sheets are 3/32 in. thick, with corrugations 3/4 in. deep, spaced on 3-in. centers. The cross ridge at the center line of the car is capped by a channel pressed from 5/32-in. plate which extends down one gusset, over the cross bearer, and up the opposite gusset. The body bolster web plate is 3/16 in. thick. The weight of the body of the class N-29 car is 18,480 lb. and of the class N-30 car 17,680 lb.

The class N-48 box car likewise has the body framing built up largely of pressings, to secure disposition of material that will combine lightness and strength. The side posts are a flanged U-section of 1/8-in. plate 3 in. deep and 7 1/4 in. wide. The side plate, which forms the top chord, is also of 1/8-in. material, pressed in a modified Z-section 15 5/16 in. deep. The end plate is a similar section. The side sill is of the same thickness, 18 in. deep with a 2 3/4-in. flange. The end sill, also of 1/8-in. plate, is 10 1/8 in. deep with a 6-in. horizontal flange. The side sheets and end sheets are 1/16 in. thick.

The roof is constructed of sheets 1/32 in. thick, with corrugations 1/2 in. high spaced 2 in. center to center, supported on carlines of a flanged W-section, 4 1/8 in. deep at the center, pressed from 3/32-in. sheets. Each roof sheet is carried across the car from one side plate to the other.

The weight of the body of the class M-48 box car is 24,380 pounds.

Table IV—Tests on Welding of Cor-Ten Plates

Thickness of Cor-Ten plates ..... 3/8 in.
Spacing of plates for butt welding ..... 1/8 in. apart
Welding machine:
Voltage 35
Current ..... 180 amp.
Polarity reversed
Size of welding rod, diameter ..... 3/16 in.

Tensile properties of samples, comparative tests on 3/8-in. plates

	Ultimate strength, lb.	Elong. in 2 in., per cent	Elong. in 1 in., per cent
Cor-Ten plates, before welding	70,700	33.0	...
Plates welded with Cor-Ten-Weld rod	74,200	17.5	23.3
Plates welded with regular carbon-steel welding rod	71,700	19.7	26.8

Similar tests made on 1/4-in. Cor-Ten plates, with original ultimate strength 79,400 lb. per sq. in. and 25.5 per cent elongation, showed for the Cor-Ten-Weld 76,400 lb. ultimate strength; 15.3 per cent elongation in 2 in., and for the regular carbon-steel weld 71,300 lb. ultimate strength; 12.5 per cent elongation. The elongation in 1 in. was 22 per cent in both cases.

Nick-break tests showed a fine crystalline fracture, free from porosity.

Brinell hardness tests on specimens of 3/4-in. Cor-Ten plates, welded with Cor-Ten-Weld rod, gave the following results:

(a) At the weld 135, 135, 135
(b) Plate adjacent to weld 143, 143, 140
(c) Plate, as produced 143, 143, 140

Pressed Steel Car Company's Hopper Car. An experimental hopper car, designed to utilize the improved properties of Cor-Ten steel has been built by the Pressed Steel Car Company. This car has been described in *Railway Age* for Nov. 10, 1934, page 573; therefore, reference will be made only to some of the special features of the design.

The center sill is of the new A.R.A. Z-bar section, reduced to 17.5 sq. in. The side posts are in two parts with the sheets between them. To reduce stresses in sheets due to pressure from the lading, particularly when the car is unloaded by over-turning, some of the panels have been dished outwardly at the center.

To reduce deflection of the center sill to the minimum,

it is tied to the girders formed by the sides at intervals of five feet or less, through the bolsters, cross ridges and cross bearers.

Each hopper chute is pressed from a single sheet, thereby eliminating the joints which ordinarily extend down the outside corners. This was done to avoid retention of lading and moisture, which might contribute to contact-corrosion. Man-Ten steel has been used in the brake rods and brake levers.

The weight of this car is 30,000 lb. and of the body alone 17,800 lb. The design of this car provides adequate cubic capacity to take full advantage of the allowable load limit in carrying coal at 52 lb. per cu. ft., thus securing a ratio of revenue load to gross weight of 81.9 per cent.

The Mt. Vernon Car Manufacturing Company has built an experimental 40-ton refrigerator car with Dry Ice temperature control. The car has a steel frame patterned after the A.R.A. single sheathed box car. About half of the steel parts are of Man-Ten, 5,330 lb. of this material replacing 7,900 lb. of ordinary steel, effecting a reduction of weight of about 30 per cent. In future designs the builder intends to use high tensile steels exclusively and anticipates a proportionate saving of weight throughout the entire body structure.

The same builder is constructing a 50-ton steel sheathed box car, modified in some details from the A.R.A. design. Cor-Ten steel is being substituted for ordinary open hearth steel, with a saving of 4,380 lb. or a reduction of 25 per cent in the weight of the steel in the car body.

In numerous other instances, applications of Cor-Ten and Man-Ten steels have been made alongside other types of steel in floor and side sheets, doors, ends and roofs. From these installations it is expected that comparative data will soon be available regarding the service of these materials under actual freight car operating conditions.

Passenger Cars

A number of important designs of passenger cars have been brought out in recent months incorporating high-tensile steels. It would be impractical in this paper to present such detailed descriptions as would be required to do justice to the originality of the several designs, therefore, only the most striking features can be mentioned.

Stainless steel containing 18 per cent chromium and 8 per cent nickel has been used extensively in high-speed trains built by the Edward G. Budd Manufacturing Company by its shotwelding process. The superior characteristics of this material are well known. The equipment in which it was used includes the Budd-Michelin car, introduced in 1931, a self-propelled car for the Reading Company, two car trains for the Pennsylvania, and the Texas and Pacific, a five-section articulated car for subway and elevated service on the lines of the Brooklyn-Manhattan Transit Corporation and the Burlington Zephyr. These numerous applications of 18-8 stainless steel indicate that this material has a definite place in car construction where the maximum economies can be obtained by reduction of dead weight, because of its suitability for fabricating into structures combining extremely light weight with relatively high strength, and maximum resistance to corrosion.

Electric Railway Presidents' Conference Committee Car.—The first application of Cor-Ten steel in passenger car construction was made in the body of the Model B street car designed under the direction of Dr. C. F. Hirshfeld for the Electric Railway Presidents' Conference Committee, and built by the Pullman Car and Manufacturing Corporation. The body is an interesting example of light weight unit construction formed of high tensile steel by welding the frame members and sheathing into a rigid structure.

Another street car embodying principles developed by the Presidents' Conference Committee was built by the J. G. Brill Company, with a light weight body formed of sections and pressings of carbon-vanadium steel.

The Baltimore & Ohio is having built by the American Car and Foundry Company two streamlined passenger trains, one of Cor-Ten and Man-Ten and the other with aluminum superstructure and Cor-Ten underframe. These trains will be equipped with cushion underframes and tight-lock couplers. Two streamlined trains of Cor-Ten are also under construction for the Gulf, Mobile and Northern by the same builder.

The Standard Steel Car Company, subsidiary of the Pullman Car and Manufacturing Corporation, is building, at the Pullman Bradley Works, 50 passenger coaches for through service for the New York, New Haven and Hartford, also 10 passenger coaches for through service and 21 suburban coaches for the Boston and Maine. The bodies of these cars are built largely of Cor-Ten with Man-Ten in the center sills, draft sills and bolsters, thus marking the first application of high tensile steels in modern coach construction. A substantial weight saving, from 135,000 lb., the weight of the present coaches, to 100,000 lb., the estimated weight of the new cars, was effected. These cars were described briefly in *Railway Age,* issue of April 7, 1934, page 516.

A light-weight self-propelled train to be built for the Illinois Central by the Pullman Car and Manufacturing Corporation at its Pullman Works will also be constructed principally of Cor-Ten.

The tendency which is apparent at this time, to adopt a wider range of materials for car construction, will probably lead to the use of other steels especially suited for particular service conditions. Among those which are being considered or undergoing tests are Plykrome, a laminated steel having a stainless sheet on one side and ordinary carbon steel on the other; 4 to 6 per cent chromium steel; and 12 per cent chromium steel.

Recent developments indicate that future car design will seek to develop to the utmost the technical and economic possibilities of ordinary carbon and copper steel and will then utilize the low-alloy high-tensile steels, the higher-alloy steels already mentioned, and perhaps additional materials, each in the application to which it is best adapted.

* * *

The Santa Fe's "Chief" at Raton, N. M.

The Dotsero Cutoff—
A Special Problem in Railway Location*

As a result of developments in the art of transportation the line as built differs widely from the locations made at various times during the last 50 years

By Arthur Ridgway
Chief Engineer, Denver & Rio Grande Western, Denver, Col.

[The author prefaced his discussion of the economics of the Dotsero cutoff by an historical review in which he showed how the barrier imposed by the Colorado Rockies resulted in the detouring of the Overland route to the north and the Santa Fe line to the south of the state and caused the Denver & Rio Grande to be extended south to Pueblo before turning westward on its route to the basin of Great Salt lake. The detour thus imposed gave rise to early efforts for the development of a shorter route leading directly west from Denver, including several location surveys, one as early as 1881, in that portion of the Colorado River valley now occupied by the Dotsero cutoff, and a study of these earlier locations, in comparison with the line actually built, has afforded an opportunity to trace the advances in the requirements of effective rail transportation during the intervening years.—EDITOR.]

WHEN Denver & Rio Grande surveyors in 1881 located a line along the portion of the Colorado river followed by the Dotsero cutoff, little consideration was given to the effect of physical characteristics of the line on its subsequent economic operation and maintenance. In fact, little was generally known 50 years ago about the precise co-ordination of the physical features of any rail line with its operating costs. The rapidly accelerating developments in the art of transportation were such that in surveys for such a line made by the Moffat road in 1902 certain features considered permissible in the survey of 1881 had to be ruled out. Still further limitations were imposed in a third survey made in 1924, while studies leading to the final location made in 1933, showed that certain characteristics that were deemed permissible only 10 years previously were objectionable in the face of the present requirements of trans-continental traffic.

Comparison of Route and Roadbed with Those of Last Previous Location

Feature	Location of 1924	Constructed Line	Difference
Length, miles	41.3	38.1	3.2
Total curvature, degrees	6758	4043	2715
Maximum rate curve, degrees	10	*6	4
Ruling gradient, descent	0.50	0.50	0
Colorado river crossings	1	9	8
Eagle river crossings	1	1	0
Tunnels	1	2	1
Bridge steel, tons	400	2,000	1,600
Concrete masonry, cu. yd.	2,050	8,728	6,678
Conc. tunnel lining, cu. yd.		5,319	5,319
Solid rock exc., cu. yd.	621,000	1,108,473	487,473
Mixed matrl. exc., cu. yd.	1,060,000	1,903,110	843,110
Overhaul, station-yards	4,300,000	10,716,910	6,416,910
Riprap, cu. yd.	20,000	42,194	22,194

* One 7-deg. 30-min. curve, the reduction of which to 6-deg. maximum involves the construction of a 1500-ft. tunnel was not warranted with the present volume of traffic.

To merit its place as a link in a through route, the cutoff must provide dependable service with a minimum transit time—in other words, it must be the shortest, and therefore straightest practicable line. Topography demanded that the line follow the course of the Colorado river for the entire distance. Because this particular reach of the river has a lower average rate of fall than those immediately above and below, the logical gradient for an economic location was necessarily lighter than

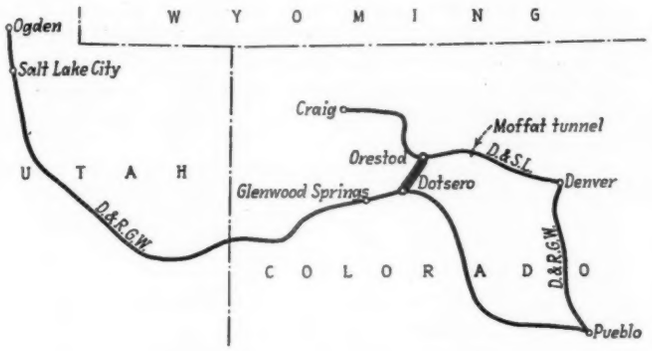
* Abstracted from a paper presented before the Western Society of Engineers. For a general description of the line and for details of construction not presented here, the reader is referred to an article in the *Railway Age* of May 10, 1934, page 339.

Before—
In Red Canyon, Looking West From Burns, Colo., Before the Construction of the Dotsero Cutoff

the ruling gradient of the operating district of which it forms a part. With the imposed limitations as to alinement and the latitude afforded as to gradient, the fixing of the maximum speed-restricting rate of curvature consistent with cost resulted, of course, in the shortest economic length of line with a minimum of total curvature. A comparison of physical characteristics of the route and roadbed adopted with those of the last previous location is illuminating. This comparison is shown in the accompanying tabulation.

Economics of the Location

An analysis of the economics of operation of the cutoff as a part of a through route resulted in the incorporation of its full length as a portion of an operating



Sketch Showing New Route Over Dotsero Cutoff

district. The ruling gradient of the particular operating district of which it is a part is greater than the minimum practicable ruling gradient of the cutoff itself. As the adjusted train tonnage for the various classes of motive power is therefore limited by other sections of the district, the only effect of the lower grades on the cutoff is higher speeds with the same tonnage trains between Dotsero and Orestod. However, the decreased transit time due to these higher speeds could not be sufficient to affect the daily pay of train and enginemen.

These facts, coupled with the economic necessity of maintaining the highest practicable speeds, immediately eliminated the element of ruling gradients from the economics of the location. The distance factor, as affecting train and enginemen's wages, was also eliminated because even a straight line between the termini would not be short enough to reduce the wages paid for the run over the whole district. The remaining factors involved in the economics of the route characteristics are simply the effects of distance, curvature, and rise and fall on the consumption of energy, on maintenance of way and structures, and on maintenance of equipment for the total gross tonnage moved, regardless of the number of trains required for the movement.

The effects of the physical characteristics of any line on the consumption of energy and the cost of maintenance may be expressed in terms of the amount of work required to move gross tonnage and the resistance of the track and equipment in the performance of the work of moving—thus:

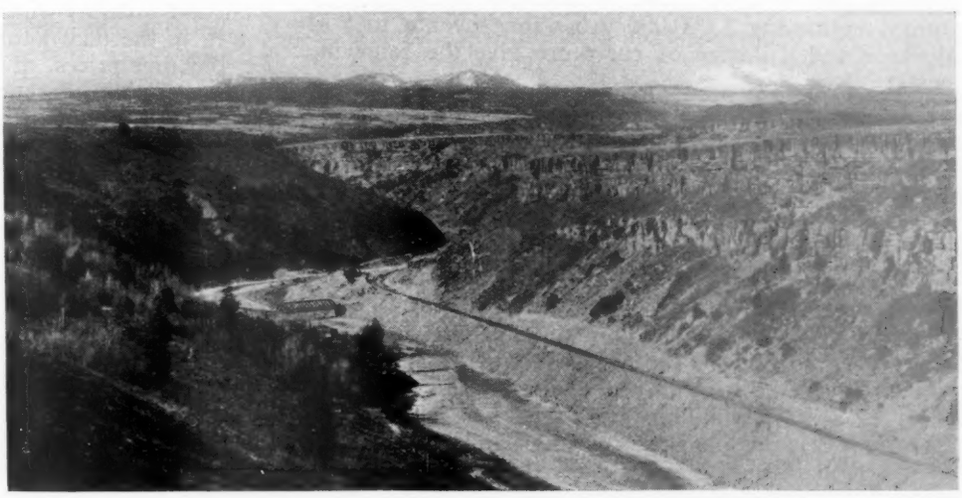
$$E = W\ [k\ (M - 2m) + c\ (D - 2d) + R - F + 2f] \quad (1)$$

$$U = W\ [2\ k\ (M - m) + 2\,c\ (D - d) + R - F + 2f) \quad (1a)$$

In these two expressions, one for the consumption of energy and the other for the maintenance of track and equipment,

W = Weight moved (tons)
M = Length of line (miles)
m = Length through which energy is consumed by braking in limiting or reducing velocity (miles)
D = Angular deflection of the route from a straight line (degrees)
d = Angular deflection occurring in the portion "m" of the route through which braking prevails (degrees)
R = Vertical distance that the weight "W" is raised in traversing the route in one direction (feet)
F = Vertical distance that the weight "W" is lowered in traversing the route in same direction (feet)
f = Vertical distance through which energy is consumed (braking) in limiting or reducing velocity (feet)
k = Vertical distance equivalent to the work required to move a unit of the weight "W" over a unit of horizontal distance (feet per mile), commonly called "rolling resistance."
c = Vertical distance equivalent to the work required to deflect a unit of the weight "W" through a unit of deflection (feet per degree), commonly called "curve resistance."
E = Energy consumed (foot-tons)
U = Resisting effort of the track and equipment in moving the weight "W" over the line (foot-tons).

These two general equations are applicable to any kind of a route, regardless of its length, alinement, or profile, for the quantity "2f" in equations (1) and (1a) provide for the initial acceleration and final dissipation



After—
A View From the Same Point as in the Picture on the Opposite Page, After the Line Was Built

of velocity as well as for intermediate stops or other constrained changes in speed. Their derivation is a rather lengthy process outside the scope of this subject, but has been published heretofore in a paper presented by the writer before the Colorado Scientific Society, March 22, 1930, and printed as No. 2 of Volume 13 of the Proceedings of that society. The application of the equations to the operation of any line or any portion thereof is, however, a simple matter.

Application to Dotsero Cutoff

In the instant case, the Dotsero cutoff, with a fairly even balance of gross tonnage in both directions, the "R" and "F" for one direction cancel the "F" and "R" in the other direction respectively, and since there are no accelerating descending gradients over which speed must be constrained by braking and generally no stops to be made, "m" and "f" will be zero. If then for "k" and "c" we assign the commonly accepted numerical values of 15.84 and 0.04, respectively, the equations for the cutoff become:

$$E = W\ (15.84\ M + 0.04\ D) \qquad (2)$$
$$U = W\ (31.68\ M + 0.08\ D) \qquad (2a)$$

For a total traffic of 1,000,000 gross tons and one foot of distance, the numerical values given by the equations are

$$E = 1{,}000{,}000 \times \frac{15.84}{5280} = 3{,}000 \text{ foot-tons}$$

$$U = 1{,}000{,}000 \times \frac{31.68}{5280} = 6{,}000 \text{ foot-tons}$$

and for one degree of curvature

$$E = 1{,}000{,}000 \times 0.04 = 40{,}000 \text{ foot-tons}$$
$$U = 1{,}000{,}000 \times 0.08 = 80{,}000 \text{ foot-tons}$$

To determine the probable cost of producing a foot-ton of energy and a foot-ton of resisting effort of the track and equipment, a comparable district already in operation was selected for analysis, and by comparable is meant similar climatic conditions, classes of locomotives used, train speeds, costs of fuel and water, and prices of maintenance materials and wage rates. Based on the total tonnage moved over the district thus selected in a typical year's operation and the total costs incurred for energy and maintenance in moving it, the resulting unit cost per 1,000 gross tons of energy was $0.008688 and the unit cost per 1,000 foot-tons of resisting effort of track and equipment was $0.012077. These unit costs applied to the number of foot-tons of energy consumed in moving 1,000,000 gross tons over a foot of distance and a degree of curvature give the following costs:

One Foot of Distance

3,000 foot-tons at $0.008688 per 1000 =	$0.025064
6,000 foot-tons at $0.012077 per 1000 =	.072462
Total	$0.097506

One Degree of Curvature

40,000 foot-tons at $0.008688 per 1000 =	$0.347520
80,000 foot-tons at $0.012077 per 1000 =	.96616
Total	$1.31368

The expense of operation and maintenance for 1,000,000 gross tons moved over a foot of distance being $0.098, a capital expenditure (with interest at 5 per cent) of $1.96 per million gross-tons was justified for every foot that the line is shortened. Similarly, an operation and maintenance expense of $1.314 per degree of curvature would justify an expenditure of $26.28 per million gross tons for every degree of curvature that could be eliminated. Without any attempt at proving the economy of what was a practical necessity, it may be said that the financial returns of the results thereof are confirmed even for the most conservative estimates of anticipated volume of traffic.

Calling for Bids

The cutoff was built by the Denver & Rio Grande Western in the name of a subsidiary, the Denver & Salt Lake Western. The project consisted of building 38.1 miles of railroad and operating appurtenances from a connection with the Denver & Rio Grande Western at Dotsero to a connection with the Denver & Salt Lake at Orestod. A contract for building the roadbed, tunnels, and bridge masonry was awarded jointly to the Utah Construction Company, the W. A. Bechtel Company, and the Morrison-Knudson Company, the railroad furnishing all the materials therefor. In advance of issuing invitations for proposals, separate specifications were prepared as follows:

Grading
Tunneling
Pipe culverts
Concrete masonry
Concrete, plain and reinforced
Foundation pile driving
Hauling construction material

Since only a preliminary location and an estimate of quantities involved therein had previously been made, the specifications had to be broad enough to cover every possible contingency that might arise in constructing a railroad through virgin territory. These specifications were particularly complete with respect to descriptions of the pay quantities of every kind that might be encountered, on the theory that in order to obtain the lowest unit prices the contractors should be paid for every move necessary to install the units of property involved in the performance of the contract work. The wisdom of such a course was proved by the low unit prices submitted by the bidders.

Many Unit Prices

The plans furnished to the prospective bidders consisted of a preliminary location profile with the grading quantities and culverts noted thereon, sketches of typical tunnel sections, and typical plans of the bridge masonry. Because of a lack of definite information as to just the kind and quantity of the materials which would be involved in the final location, the form of proposal asked for 103 unit prices, of which 42 were for the overland hauling of the different kinds and sizes of culvert pipe, cement, reinforcing steel, timber, foundation piling, and miscellaneous material. For example, a separate price was asked for hauling per lineal foot per mile of profile distance for each size and kind of culvert pipe which might be specified subsequently for the numerous drainage openings through the roadbed. By the time the proposals were received more definite information showed that some of the quantities for which unit prices had been requested could be eliminated. The contract, however, as entered into still contained 84 of the unit prices proposed by the contractors. These were logically grouped under the different portions of the work covered by the separate specifications as previously listed.

Particular mention should be made of the specifica-

tions for hauling the construction materials, which were to be furnished f.o.b. cars by the railroad. Neither Orestod nor Dotsero was accessible to the contractor. Nor did either terminus have trackage facilities for the delivery of the many carloads of material. The nearest convenient rail point for such delivery was at Gypsum, a station seven miles east of Dotsero. From this point a country road over the mountain touched the line under construction at a profile distance of about 10 miles from Dotsero. Specifications for hauling provided for the payment for overland transportation of each unit of material per mile of profile distance from the delivery rail head to the point where it was installed in the roadbed or structure, with an arbitrary four mile additional distance for all materials delivered at Gypsum. The contractor was required to provide his own road for hauling and was at liberty to follow any overland route he elected, regardless of the length of the route chosen. As it actually developed in the progress of construction, very little material was hauled out from the rail head of the new track, most of it being unloaded at Gypsum. Because of the care with which these details were worked out, the compensation for every item could be easily computed with precision, while the great variety of all other contract prices proved of equal facility in computing the contractor's total compensation.

Track Laying and Bridge Work

The construction of the ballasted deck pile bridges, the setting of steel bridge superstructures on the masonry, the tracklaying and ballasting, and the building of other operating appurtenances were accomplished by company forces. Although the contractor's work was opened up and prosecuted with little regard to direction, the railroad building proceeded from one end of the line only, or from Dotsero toward Orestod. The work was done at a time when there was a surplus of railroad equipment, such as locomotives, cars, and roadway machines. Materials to be installed by railroad forces were therefore delivered about as required and left on board cars until so used, thus eliminating material yard handling. The general plan under which railroad forces operated was about as follows:

Skeleton track was laid on the finished grade to a bridge opening. While the pile driver and bridge crew were constructing either the permanent pile bridge or the falsework for placing the steel girders, the tracklaying crew fully tied, plated, and surfaced with locomotive cinders the new track previously laid in skeleton. Then, as opportunity afforded without delaying the skeleton tracklaying the bridge girders were set off the cars on skids prepared in advance alongside the temporary trestle falsework, and after they were connected up, and temporarily decked, they were jacked into final position. At some of the river crossings no falsework was constructed for the approach spans, the hoisting equipment at hand having sufficient capacity to put the approach girders in place from the rail ends. By following this method, one large tracklaying crew and one bridge crew, equipped with the necessary self-propelling roadway machines, built all the bridges and laid all the track with a running surface from one end of the line to the other. The permanent passing tracks and temporary spurs for material and outfit cars were installed as the main-track rail laying proceeded.

Surfacing

There are two deposits of superior gravel at about midpoint in the length of the line. One of these, 22 miles from Dotsero, was eminently satisfactory for use as pit-run ballast, and when the main-track rails had reached this deposit a second raise of the track previously laid was made with the pit-run gravel spread on top of the locomotive cinders used in making the running surface raise. This second raise was carried forward as fast as the tracklaying and the running surface on cinders proceeded. Freezing weather prevented ballasting operations with the very coarse gravel from the other pit until the spring of 1934. The gravel in this pit, consisting generally of very hard granitic boulders, was run through a crusher, breaking it down to a maximum size of 1½ in., and loaded direct from a storage hopper into cars. The last raise of track and the final dressing of the ballast section were given with this crushed gravel, which has characteristics similar to those of broken stone ballast.

A. A. R. Asked to Study Clearing House Proposal

WASHINGTON, D. C.

CO-ORDINATOR Eastman on November 27 submitted to the Regional Co-ordinating Committees a report by N. B. Haley, one of his research assistants, on the proposal for the establishment of a clearing house for American railways, replying to the report of a special committee of railway finance and accounting officers to which the proposal was referred, with a suggestion that it might well be studied through the Association of American Railroads by qualified men wholly dissociated from individual railroads. In his letter Mr. Eastman says that "something has been accomplished" but that the report of the special committee is far from satisfactory. The committee had rejected the clearing house proposal, either on a national or regional scale, and had recommended "a method of effecting more prompt settlements between carriers through the extension of the net settlement plan, such as is now partially in effect, to include other charges and credits.

On March 30 Mr. Eastman had submitted to the Regional Co-ordinating Committees a memorandum on a "Clearing House for American Railways," prepared at his request by Mr. Haley, then attached to the Interstate Commerce Commission's Bureau of Finance and now director of its Bureau of Air Mail; and recommended that provision be made at once for a thorough study of this subject by an appropriate committee of railroad finance and accounting officers. On April 4, in connection with the subject of reaudits of interline accounts, he brought again to the attention of the co-ordinating committees the matter of simplification of divisions, referred to incidentally in Mr. Haley's memorandum. On November 1 he received a copy of the final report of the committee which had been appointed. Saying he understood that this report meets with the approval of the co-ordinating committees, Mr. Eastman added:

"Something has been accomplished. Good progress has been made in the simplification of divisional bases; steps have been taken to improve the settlement of accounts between the federal government and the railroads; and the committee recommends an extension of the so-called 'net settlement' plan, which embodies a restricted application of the clearing house principle and is an improvement over present conditions, so far

as it goes. Nevertheless, the report of the special committee is far from satisfactory.

"There is nothing new in the clearing house idea. The principle has for many years been applied with great success in the banking business. It has also been applied with equal success by the British railroads. Fundamentally it is simple and sound. I cannot believe that its application to the intercompany transactions of the American railroads is impracticable. Nothing in the report of the special committee is persuasive that this is the fact. The report is largely a statement of conclusions. It does not contain a comprehensive or adequate discussion of the subject. The intercompany accounting transactions of the railroads are almost incredibly complex and expensive, and saturated with duplications of effort. Surely they are capable of much improvement.

"While I recommended the appointment of such a special committee as was appointed to consider this subject, upon further thought I question whether this was a sound recommendation. I say this without any reflection upon the experienced and competent officers who made up this committee. They may be too close to the transactions which they were asked to investigate. From such a perspective it is the trees which are seen and not the forest. Furthermore, the officers of individual railroad companies always shy at any proposal which would substitute collective for individual effort. It is entirely natural that this should be their reaction. For the very purpose of securing independent and disinterested consideration of such matters which are of common concern to all of the railroads, the Association of American Railroads has been formed. May I not suggest that this clearing house proposal might well be studied through that Association by qualified men who are wholly dissociated from individual railroads."

Conclusions of Haley Report

Mr. Haley's report closed with the following conclusions:

The Clearing House Plan proposes to travel the road to improved methods with a modest beginning by dealing at first with only the financial settlement of intercompany accounts. With this function as a nucleus, after the work is consolidated to cover the various accounts of all the members, the ultimate and major objective would be a central accounting agency for all interline traffic matters. When consideration is given to the millions of separate interline freight shipments monthly for each of which there is a detailed reporting by the destination carrier, as well as a subsequent verification of all the details by the originating and each intermediate road, the cost is staggering, and unquestionably could be reduced 75 per cent through a clearing house system by changes in methods which can not be adopted by individual railroads, even though certain limited short-cut methods are being tried by certain railroads at present.

In further studies of the subject I suggest the first step should be to determine the present cost of handling the interline accounts and settlements. In some cases this will involve segregation of costs common to other audit office and treasury work, but that should offer no insuperable difficulty. Some reasonable basis of allocation can be found. The industry should at least know what it is now costing to perform this unproductive function. The next step should be, I think, to determine what part of that cost would be required to finance a suitable clearing house organization. The difference would be the measure of savings.

I believe it would be entirely feasible to develop the clearing house not only for the collection and disbursement of money, which should be its initial function, but gradually to handle the accounting for all interline business. The accounting would thus be performed only once, instead of by every carrier involved under present procedure. A standing auditing committee representing the members would afford a constant and adequate check. A complementary committee of traffic officers, with rotating membership, would likewise be in position to arbitrate all disputes with respect to divisions. With such a set-up there would be some hope of accomplishing in time a simplification of tariffs the complexity of which at present appears to lie at the root of most of the differences between the carriers in the settlement of their interline accounts.

The same amount of effort involved in the committee's proposal to extend the "Net Settlement Plan" would go a long way toward accomplishing these results, through the establishment of a central clearing house system, in a more systematic, effective, and permanent way, and, as I said to the committee:

"The present, as I see it, is the ideal time to introduce a major device for economy like the clearing house when the volume of business is low and the disturbance resulting from its installation and adaptation can therefore be minimized. In that way the machinery will be all set up, worked in, and ready to function when prosperity again sets in in this country. That is the time when the greatest economies can be realized; but it is also the time when we are least able, either through the lack of incentive or ability to stand the extra work, to undertake such a project."

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended November 24 totaled 561,313 cars, a decrease of 23,212 cars as compared with the total for the week before and of 24,425 cars as compared with the corresponding week of last year but an increase of 67,995 cars as compared with 1932. Live stock was the only commodity classification to show an increase over last year's figures, but l.c.l. merchandise showed an increase as compared with the preceding week. The summary, as compiled by the Association of American Railroads, follows:

Revenue Freight Car Loadings

Week Ended Saturday, November 24, 1934

Districts	1934	1933	1932
Eastern	122,902	132,525	109,177
Allegheny	106,632	113,405	89,908
Pocahontas	40,602	38,701	36,965
Southern	85,888	83,705	74,905
Northwestern	68,375	67,896	56,775
Central Western	86,894	98,009	78,864
Southwestern	50,020	51,497	46,724
Total Western Districts	205,289	217,402	182,363
Total All Roads	561,313	585,738	493,318
Commodities			
Grain and Grain Products	27,938	32,140	26,663
Live Stock	19,152	17,607	17,102
Coal	119,165	129,067	115,047
Coke	4,856	6,585	4,945
Forest Products	20,108	23,148	14,757
Ore	3,650	4,529	1,727
Merchandise L.C.L.	159,635	165,102	146,751
Miscellaneous	206,809	207,560	166,326
November 24	561,313	585,738	493,318
November 17	584,525	602,708	572,623
November 10	594,932	583,073	536,687
November 3	612,457	614,136	587,302
October 27	624,252	642,423	617,284
Cumulative Total, 47 Weeks	28,193,515	26,632,816	25,696,670

Car Loading in Canada

Car loadings in Canada for the week ended November 24 totaled 47,748, which was an increase of 3,256 cars over last year's loading but was 2,516 cars under the total for the previous week, according to the compilation of the Dominion Bureau of Statistics.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
November 24, 1934	47,748	20,054
November 17, 1934	50,264	19,359
November 10, 1934	51,228	19,817
November 25, 1933	44,492	19,643
Cumulative Totals for Canada:		
November 24, 1934	747,862	48,178
November 25, 1933	688,772	38,260
November 26, 1932	766,522	50,033

James B. Hill Elected President of Louisville & Nashville

Is succeeded as head of Nashville, Chattanooga & St. Louis by Fitzgerald Hall, vice-president and general counsel

JAMES B. HILL, president and a director of the Nashville, Chattanooga & St. Louis, has been elected president and a director of the Louisville & Nashville, as announced in the *Railway Age* of December 1, and has been succeeded as head of the N. C. & St. L. by Fitzgerald Hall, vice-president and general counsel. Mr. Hall is also a director of the smaller line. Mr. Hill succeeds the late Whitefoord R. Cole, whose death on November 17 was recorded in the *Railway Age* of November 24.

James B. Hill

Fitzgerald Hall

Through stock ownership, the L. & N. controls the N. C. & St. L., and the election of Mr. Hill marks the second consecutive time that the L. & N. has gone to the smaller line for its chief officer. Mr. Hill thus follows in the steps of Mr. Cole who "graduated" from the presidency of the N. C. & St. L. to that of the parent company in 1926. At that time Mr. Hill, who had been assistant to the president of the smaller line under Mr. Cole, was advanced to president.

Both in natural ability and in experience, Mr. Hill is equipped to assume the broader responsibilities inherent in his new position. His ability as a railroad operator is demonstrated by his record as head of the N. C. & St. L., while the experience he has gained in grappling with the troublesome problems of recent years will be valuable in facing the same problems in similar, though enlarged, form on the L. & N. Moreover, by reason of their close association in former years, Mr. Hill is thoroughly familiar with those policies of Mr. Cole that formed the basis of his success as head of the L. & N.

Mr. Hill's term of office on the N. C. & St. L. has been fraught with many difficult and intricate problems. He assumed executive direction of the line at a time when the inroads on railroad freight and passenger traffic made by the bus, the truck and the private automobile first began to assume serious proportions. At the same time the railroad, through rigid economy and efficiency in operation, was striving to overcome the drains of substantial increases in taxes and wages to employees. Another problem to be faced was that of reducing an operating ratio that had hovered in the vicinity of 80 for some years.

The railroad, therefore, adopted the policy inaugurated under Mr. Cole and continued under Mr. Hill, of making large capital expenditures for improvements to equipment and roadway as a means of reducing transporta-

tion expenses. In addition, an intensive campaign was instituted among the employees for the purpose of obtaining a reduction in the amount of fuel consumed. These policies had their effect. An operating ratio of 79.82 in 1927 dropped to 74.98 in 1929, with only a moderate increase in operating revenues. Moreover, owing to the excellent condition of its track and structures, the railroad has been enabled to make drastic reductions in maintenance expenditures during the depression years without experiencing a marked deterioration in the condition of the property.

During the depression, the railroad, under Mr. Hill's direction, has struggled valiantly to maintain its excellent earnings record. While dividends were suspended in 1932 for the first time since 1904, these struggles were not without success. Much local freight traffic has been recaptured by storedoor pick-up and delivery service, while lower passenger fares, inaugurated in 1933, brought an increase in the number of passengers carried in that year for the first time in 10 years.

Mr. Hill is known as a simple, friendly and unassuming man. He is characterized as a man of ability, sound judgment and clear and direct thought.

James B. Hill

James Brents Hill was born on November 14, 1878, at Spencer, Tenn., and graduated from the George Peabody College for Teachers at Nashville, Tenn., in June, 1898. Previous to that time he had worked as a relief operator on the N. C. & St. L. at Bon Air, Tenn. After completing his college course, Mr. Hill returned to railway service in August, 1898, as a clerk and operator on the N. C. & St. L. at Sparta, Tenn. He later served as clerk and stenographer in various division offices and in 1903 was transferred to the office of the secretary and treasurer. Mr. Hill was promoted to transfer agent and assistant secretary in 1915 and three years later was promoted to chief clerk to the federal manager of the N. C. & St. L., the Tennessee Central and the Birmingham & North-western. Upon the termination of federal control on March 1, 1920, he was appointed transfer agent, assistant secretary and chief clerk to the president of the N. C. & St. L., being promoted to treasurer and assistant to the president in April, 1922. He was promoted to president in 1926.

Fitzgerald Hall

The election of Mr. Hall to the presidency of the N. C. & St. L. is another instance where a man of legal training has been selected to guide a railroad through the maze of legal red tape with which the carriers are confronted today. However, in his 20 years of service with the N. C. & St. L., Mr. Hall has worked closely with his two immediate predecessors, and has thereby acquired a broad and intimate knowledge of the affairs of the railroad in general.

Mr. Hall's rise on the N. C. & St. L. was quite rapid. He became head of the law department of the railway in December, 1918, following the death of Judge Claude Waller, and was elected vice-president in 1926, after a total of only nine years service with the company. Moreover, he is assuming the presidency of an important line as a relatively young man, being only 45 years of age. Possessed of a keen mind—he is a member of Phi Beta Kappa, honorary scholastic fraternity, which he served as president—Mr. Hall is a man of many affairs. He is a public speaker of ability and is known for his democratic attitude toward his associates on the railroad. Upon the death of his father, who was dean of the law school at Vanderbilt University, Mr. Hall took over one of his law classes which he taught for 11 years.

Mr. Hall came into prominence recently when he was chosen to present the case of the New York Central and the L. & N. in the federal district court at Chicago, when these lines attacked a ruling of the federal co-ordinator of transportation forbidding the latter company from rerouting its trains from the Chicago & Eastern Illinois to the Cleveland, Cincinnati, Chicago & St. Louis between Evansville, Ind., and Chicago.

Fitzgerald Hall was born on December 6, 1889, at Nashville, Tenn., and was educated in law at Vanderbilt University. In 1914 he engaged in the practice of law with Childers & Woodward, Pulaski, Tenn., and was later elected assistant United States district attorney for the Middle district of Tennessee. In the following year Mr. Hall went with the N. C. & St. L. as assistant general counsel, serving in this position until 1918, when, under the United States Railroad Administration, he was made assistant general solicitor and later general solicitor. In 1920 he was made general counsel, and in 1926 he was elected also vice-president. Mr. Hall was holding these positions at the time of his recent election to the presidency. He is also a director of the Third National Bank of Nashville.

Readjustment of Western Grain Rates Prescribed

WASHINGTON, D. C.

A GENERAL readjustment of rates on grain and grain products within the western district which it is estimated may reduce the revenues of the western roads by some $6,000,000 to $8,000,000 a year, to become effective by April 1, 1935, is prescribed by the Interstate Commerce Commission in a report and order made public on December 5 following further hearings in the western grain case, Part VII of the rate structure investigation under the Hoch-Smith resolution, undertaken by the commission in 1925. The proceeding also embraces 58 formal complaints and suspension proceedings consolidated with the general investigation, some of which, or their predecessors, date back several years before 1925. The estimate of the prospective revenue reduction was made unofficially within the commission's organization and compares with a reduction of $20,000,000 which the railroads estimated would result from the commission's original reduction in this case, prescribed in an order issued in 1930. Tariffs filed to comply with that decision became effective August 1, 1931, but were cancelled February 20, 1932, as a result of a decision of the Supreme Court of the United States requiring vacation of the order because of the commission's denial of petitions of the carriers for further hearings, on the ground that general economic conditions, reflected in the nation-wide depression, had so changed as to make the order, based on a record closed in September, 1928, unresponsive to current conditions.

The general plan of the adjustment now prescribed, in the light of new testimony as to the financial condition of the carriers and the general economic status of the grain producers and shippers, is the same as in the original report but the effect is to produce higher general levels of rates in southwestern and inter-

mountain territories than were originally prescribed. In western trunk line territory the general level is the same as in the original report. In the Southwest the rates are made on the basis of an average of the single and joint-line rates under what is known as the second 12,244 scale with modified grading, and are higher than prescribed in the original report but on the whole slightly lower than the present rates. In the intermountain and Pacific coast territories, with certain exceptions, the present rates are not disturbed when they do not exceed the revised southwestern basis. The resulting rates in that territory will be higher than prescribed in the original report, but on the whole will remain substantially on the present basis.

Through rates over reasonable direct routes through Minneapolis and Missouri River markets to Chicago, St. Louis, Memphis and the Southwest are to be made by combination of prescribed local rates to the intermediate markets and the prescribed proportional rates beyond—the so-called rate-break combinations. These combinations are to be applied on all shipments stopped at the intermediate markets. On such shipments proportional rates will therefore exclusively apply in all instances, and lower transit balances resulting from one-factor through rates less than the rate-break combinations will be eliminated.

Transit stops without separate charge will be limited to two. Stops for storage in transit will be treated as any other stops in transit. A charge for a stop for inspection will be made only when the shipment is reconsigned after inspection. An inspection at delivery point will be considered as merged in the delivery, and no charge will be made. Carriers are directed to revise their transit rules to eliminate excessive out-of-line and back hauls and unreasonably liberal transit mixtures.

Mixed carload rules should be revised, the report says, to confine shipments in mixed carloads to commodities in the grain and grain products "family group," eliminating from the mixtures articles foreign to that group. In no instance should the mixture from the transit point be broader than that from the origin from which the through rate applies.

Rates on cereal food preparations are to be higher than on grain and its direct products.

Permission to make a minimum charge of 10 cents in the inbound local rates to the rate-break markets is rescinded and interior scales are eliminated.

In checking in the revised adjustment the commission prescribes that the rates from stations between key points shall be graded not to exceed one-half cent for each 15 miles, subject to prescribed key-point rates as minima.

The commission also requires that transit rules and mixtures and mixed carload rules should be uniform throughout the entire western district and that the same rates be applied on wheat and flour and on wheat and coarse grains.

In view of the present lack of export movement and the findings of the Supreme Court in the Galveston case, export rates are left to the discretion of the carriers.

Three Dissents; Several Concurring Opinions

Commissioners Aitchison, Tate, and Splawn dissented and Commissioners Lee, Porter, Farrell, Mahaffie and Miller wrote separate opinions concurring or concurring in part. Commissioner Miller said that the general level prescribed, resulting in substantial reduction in the aggregate revenue of the carriers, was in his judgment too low.

Commissioner Splawn said in part: "While the report deals at some length with general conditions of both the carriers and the farmers, there is very little in it as to the reasonableness or lawfulness of specific rates in the way in which such rates are generally considered in proceedings before us. Many rates are reduced, some are increased, and in numerous instances important relationships are changed. I have carefully studied the report but am unable to discover the facts upon which many of these changes are predicated. From such facts and discussion as are presented, I have been unable to reach a conclusion as to the lawfulness of many of the existing rates and practices, or whether the rates and practices prescribed will be productive of harm or good. Many conclusions seem to me to have been arrived at arbitrarily. I am unable to agree that this record of changed conditions requires that we order substantial reductions in the rates in South Dakota for instance, and at the same time find justified a much higher level of rates in Oklahoma. It is clear that the rates prescribed are not responsive to the evidence as to the relative financial condition of the western trunk-line and southwestern carriers."

Commenting on contentions made on behalf of the grain producers at the hearings as to "the over-built character of the railroads," the report says: "A substantial expansion of railroad facilities in recent years must be accepted as an established fact; likewise the apparent need for that expansion for traffic then present or in reasonable anticipation. Failure to provide means for the handling of increasing tonnage would have subjected the carriers to merited criticism. It is equally clear that the railroad plant of today as a whole is more than adequate to handle traffic now offering or in immediate anticipation." The report also includes the following as to the standard of reasonableness of rates in circumstances such as those now existing, which it says underlies the rates prescribed.

"The standard of reasonableness of rates on a group of commodities, such as grain and grain products, is neither constant nor capable of precise definition, but must take into account, at the time of review, general conditions affecting both carriers and shippers, including the value of the service rendered by the carriers, the value of the transported commodities and of the service to the shippers, and what the traffic can reasonably bear, both inherently and in comparison with other commodities and with traffic as a whole. The rates on traffic remaining to the rails after the inroads of subnormal freight offerings and alienation to competing forms of transportation must be reasonable, and can not be increased above a reasonable level in order to insure to the carriers the return on investment they would have received on a normal volume of rail traffic. This observation is particularly pertinent to grain and grain products, which, because of their inherent character and largely due to transit afforded by the rail lines, continue to move principally by rail. The decline in the value of grain has been great in recent years. During the period of the reopened hearings, with the exception of a short period immediately preceding their close, the value of grain averaged approximately half of that of the pre-war period. Since the close of the hearings prices have improved, but are still below those of the pre-war period. The carriers' rates for the transportation of grain and grain products average between 140 and 150 per cent of the pre-war rates. The only practicable test of reasonableness of the rate level on these commodities is the one of judgment of the regulating body upon all of the facts, circumstances and conditions affecting both carriers and shippers. That standard underlies the rates herein prescribed."

Communications . . .

Get Names of Passengers for Direct Mail Campaigns

SUMMIT, N. J.

TO THE EDITOR:

It seems to the writer that the passenger departments of the railroads as well as the Pullman Company are overlooking an opportunity for building good will, particularly among those who use Pullman accommodations—an opportunity that is being taken advantage of by the airplane companies.

While I am a great user of railroad transportation, there are times when I use the airplane. Whenever I travel by airplane the company on whose line I travel insists upon getting my name and address, and hardly a week passes that I do not get a piece of literature of some kind from one of these lines. I know of no good reason why this same procedure should not be carried on by the railroads. It certainly is a builder of good will.

If, on his return from a trip, a traveler found a letter from the railroad company saying they hoped he enjoyed his journey, that any suggestions or complaints would be gladly received, and asking him if he would use that railroad on his next trip, and from then on whenever they had a change of schedule or some interesting item about their service a postcard or a letter would call it to his attention, I believe it would create a good impression. In other words, the railroad companies would be attempting something which the writer thinks they have failed to do in the past—that is, sell the railroads and the service they have to offer to the public.

G. S.

What Speed Should Railroads Aim At in Accelerating Trains?

NEW YORK

TO THE EDITOR:

The whole country is today witnessing with absorbed interest the phenomena of speed as applied to railways. The so called Streamlined trains traveling at speeds ranging from 60 miles to a reasonably sustained rate of 120 miles per hour, afford a spectacle which is breath taking in effect, if not awe inspiring.

Involuntarily or otherwise, the public is being drawn to the conclusion that we must immediately attain to higher and higher speeds in transportation. Why this conclusion?

What is the motive underlying the decision to speed up passenger service to the highest point attainable? Is it:

1. To meet competition?
2. To demonstrate ability to achieve?
3. To advance science?

Grant that it is entirely possible to travel by rail under ideal conditions in perfect safety at the rate of two or even more miles per minute. . . . What of it? Should not that logical conclusion suffice for the present; then settle down to a poised basis of speed to be bettered as conditions are bettered in track elevation, grade crossing elimination and other physical features of the present day railroad. We must progress but is it wise to attempt the ultimate too soon?

There is a certain satisfaction in proving that specific things are possible of attainment but unless the product is of immediate practical use and profitable from the standpoint of current human needs, it should be regarded in its true light as a valuable experiment and an open path to future progress.

The safest future is that which develops logically from the past. The more violent the revolution, the more ephemeral the result. The century plants does not bloom over night.

R. T. RELDAS.

New Books . . .

A Hundred Years of Inland Transport, by C. E. R. Sherrington, 376 pages, 8½ in. by 5¼ in. Bound in cloth. Published by Gerald Duckworth & Company, Ltd., London, England. Price 15 shillings.

This book is designed to be a chronicle of achievement, showing the effect of transportation on the social organization of Great Britain, it being the hope of the author that it "will succeed in reminding the reader of the debt he owes to transport efficiency." After the initial chapter, which directs the reader's glance backward from 1830 for a view of pre-victorian transport, the story becomes that of the railway era, from the coming of the railroads in the 1830-1839 period to the co-ordination of transport during 1930-1933. A final chapter views the English transport scene in retrospect.

Mr. Sherrington, who is secretary of the Railway Research Service, London, is the author of other works on transport and has in the past contributed articles on British railway developments to *Railway Age*. Railway men in this country will recall his visit here last year at which time he delivered several addresses before railroad and traffic organizations.

Proceedings of the American Railway Engineering Association for 1934. 1214 pages. 6 in. by 9 in. Bound in cloth or half Morocco. Published by the association, 57 East Van Buren Street, Chicago. Price—cloth $8, half Morocco $9.

The annual Proceedings of the American Railway Engineering Association may be described as progress reports on the advance in railway engineering, for they represent the result of a year's work, and in many cases several years' work, of 28 technical committees on problems having to do with all phases of this field. Because of the encyclopedic character of this work, no more than a fleeting glimpse of its contents can be given within the compass of a book review. Among the most comprehensive features is the Sixth Progress Report of the special Committee on Stresses in Track which covers 239 pages. Another, representing the product of several years of intensive effort, is a new specification for steel railway bridges. Still another embraces a series of studies of various classes of work equipment used in the maintenance of tracks and structures. On the whole, however, the contents of the Proceedings may be characterized as a record of the progressive advance along a wide front, that embraces such diversified subjects as track tools, pipe joints, transit-mixed concrete, and the protection of track from drifting sand. Among the most valuable features of the book are the statistical data for 1933 on such subjects as rail failures, crosstie renewals, and tie service records.

Principles of Inland Transportation, by Stuart Daggett. 898 pages, 9 in. by 6 in. Illustrated. Bound in cloth. Published by Harper & Brothers, New York. Price $4.

This is a revised edition of Professor Daggett's previous book of the same title which was published in 1928. The latter has been a standard textbook and the present work brings it down to date and materially enlarges it. All forms of transportation are again covered because the author remains persuaded "that these different mechanisms of transport are so closely connected with one another in the common task of moving people and goods, that it is no longer possible to understand the activities of any one of them without being cognizant, in some degree, of the work of the others also."

Outlining, in this edition's preface, some departures which he has made from his original work Professor Daggett lists the omission of most of the discussions on economic geography. On the other hand certain sections of the book have been considerably enlarged such, for example, as those dealing with motor vehicles, street railways, aviation, railway rates and valuation. Also, there is included new treatment of old problems, together with a consideration of recent transport changes. Furthermore, aside from the foregoing, the author regarded the present an opportune time for revising the work because, from his own point of view, it permitted him "to speculate in more leisurely fashion concerning problems which he thinks are interesting and important, upon which the experience of recent years has thrown some light."

NEWS

Rail Net for Ten Months Totaled $391,234,826

Return of 1.75 per cent compares with net of $398,823,841 or 1.77 per cent in 1933

Class I railroads for the first ten months of 1934 had a net railway operating income of $391,234,826, which was at the annual rate of return of 1.75 per cent on their property investment, according to reports compiled by the Bureau of Railway Economics of the Association of American Railroads. In the first ten months of 1933, their net railway operating income was $398,823,841 or 1.77 per cent. Operating revenues for the ten months totalled $2,756,973,536, compared with $2,592,587,825 for the same period in 1933, an increase of 6.3 per cent. Operating expenses for ten months amounted to $2,048,849,186, compared with $1,870,595,233 for the same period in 1933, an increase of 9.5 per cent.

CLASS I RAILROADS—UNITED STATES

	1934	1933	Per cent of Increase or Decrease
Month of October			
Total operating revenues	$292,902,774	$294,351,521	0.5 Dec.
Total operating expenses	212,571,743	204,713,070	3.8
Taxes	20,646,435	21,260,570	2.9 Dec.
Net railway operating income	48,624,984	57,366,045	15.2 Dec.
Operating ratio—per cent	72.57	69.55	
Rate of return on property investment—per cent	1.46	1.71	
Ten Months Ended October 31			
Total operating revenues	$2,756,973,536	$2,592,587,825	6.3
Total operating expenses	2,048,849,186	1,870,595,233	9.5
Taxes	209,389,781	220,894,173	5.2 Dec.
Net railway operating income	391,234,826	398,823,841	1.9 Dec.
Operating ratio—per cent	74.32	72.15	
Rate of return on property investment—per cent	1.75	1.77	

Class I railroads in the ten months paid $209,389,781 in taxes compared with $220,894,173 for the same period in 1933, a decrease of 5.2 per cent. For October, the tax bill amounted to $20,646,435, a decrease of $614,135 or 2.9 per cent under October, 1933.

Thirty-one Class I railroads failed to earn expenses and taxes in the first ten months of 1934, of which 9 were in the Eastern district, 7 in the Southern, and 15 in the Western.

Class I railroads for October had a net railway operating income of $48,624,984, which, for that month, was at the rate of 1.46 per cent. In October, 1933, their net was $57,366,045, or 1.71 per cent. Operating revenues for October amounted to $292,902,774 compared with $294,351,521 in October, 1933, a decrease of 0.5 per cent. Operating expenses in October totalled $212,571,743, compared with $204,713,070 in the same month in 1933, an increase of 3.8 per cent.

Class I railroads in the Eastern district for ten months had a net of $229,157,103, at the rate of 2.19 per cent. For the same period in 1933, their net was $240,536,290, or 2.28 per cent. Operating revenues in the Eastern district for ten months totalled $1,400,488,120, an increase of 5.5 per cent above the corresponding period in 1933, while operating expenses totalled $1,012,118,050, an increase of 9.3 per cent. Class I railroads in the Eastern district for October had a net of $24,791,300, compared with $27,792,315 in October, 1933.

Class I railroads in the Southern district for ten months had a net of $43,656,942, at the rate of 1.61 per cent. For the same period in 1933, their net amounted to $48,931,139, at the rate of 1.77 per cent. Operating revenues in the Southern district for ten months amounted to $340,777,099, an increase of 4.8 per cent above the same period in 1933, while operating expenses totalled $263,518,766, an increase of 8.5 per cent. Class I railroads in the Southern district for October had a net of $4,108,863, compared with $5,336,078 in October, 1933.

Class I railroads in the Western district for the first ten months in 1934 had a net of $118,420,781, at the rate of 1.29 per cent. For the same ten months in 1933, they had a net of $109,356,412, at the rate of 1.18 per cent. Operating revenues in the Western district for ten months amounted to $1,015,708,317, an increase of 8.1 per cent above the same period in 1933, while operating expenses totalled $773,212,370 an increase of 10.2 per cent. For October, the railroads in the Western district reported a net of $19,724,821. The same roads in October, 1933, had a net of $24,237,652.

Cleveland Terminal Sued for Payment on Land

The Wheeling & Lake Erie has instituted suit against the Cleveland Union Terminal Company and five other corporations, the New York Central; the Cleveland, Cincinnati, Chicago & St. Louis, the New York, Chicago & St. Louis, the Vaness Company and the Union Terminals Building Company, to recover payment for land now used by the new union terminal.

Shippers Voice Opposition to Freight Rate Increase

Final hearings in Ex Parte 115 were expected to be concluded before end of week

The final hearing in Ex Parte No. 115, on the application of the railroads to the Interstate Commerce Commission for authority to increase freight rates, before Commissioner C. B. Aitchison, was expected to be concluded before the end of the week and oral arguments before the full commission are to be heard beginning on January 9. Briefs are to be filed by January 4 and reply briefs by January 24. The final hearing at Washington was begun on November 26 and after nearly a day had been devoted to cross-examination of railroad witnesses who had testified at the initial hearing in October, testimony was begun on behalf of shippers opposing the increase who had not been heard at the western hearings. Over two days were devoted to the evidence of the lumber interests, who put in an elaborate case in opposition to any rate advance and taking the position that the railroads would obtain better results by reducing rates. This was followed by over three days of testimony on behalf of the coal interests, both anthracite and bituminous, who had also prepared a very elaborate opposition, and then by group of fruit and vegetable shippers. Meanwhile a large number of miscellaneous shippers were heard in two separate hearings before Examiners McGrath and Witters.

Commissioner Aitchison has succeeded in condensing the hearings in this case into a shorter space of time than has ever before been devoted to a similar proceeding by ruling out a great deal of argumentative testimony, requiring the filing of prepared statements without reading, and by bringing about a co-ordination of the cross-examination to reduce duplication. As a result a large part of the record consists of statistical exhibits prepared to get into the record facts that can be used in the preparation of briefs and in arguments to be heard by all the commissioners. There was comparatively little discussion of railroad finances or in disputation of the railroad evidence, but a large amount of testimony as to the depressed condition of the industries and some demands for a reduction in railroad fixed charges. The principal points made in opposition to the railroad proposals, as in the other hearings, were that commodity prices have been reduced while freight rates are still generally at a relatively high level; that higher rates will lead to further diversion of traffic to

truck and water transportation and in many instances will tend to stimulate the use of substitute commodities produced at a shorter distance from the point of consumption.

Wilson Compton, general manager of the National Lumber Manufacturers' Association, said that a rate increase would "disproportionately increase the barriers to the resumption of general building activity." He said that a larger percentage of lumber now moving by rail is being shipped on rates two or three times, or more, the mill price of the lumber itself and that freight rate discrimination against lumber had resulted in substitution of other materials totaling, in the last 15 years, more than 10,000,000 average carloads of lumber. He said that present rail transportation costs for lumber are from one and one-fourth to four times the cost for competing materials, per ton.

A large number of witnesses appeared for the coal industry. A. B. Jessup, president of the Anthracite Coal Producers' Association, said that the industry is in no condition to stand a rate increase and that 90 per cent of the anthracite tonnage would be subjected to an increase of at least 30 cents a ton under the railroad proposal, which he said would lead to a further loss of markets and stimulate the practice of trucking direct from mines to consumers. He said the industry does not welcome the change to truck transportation, which operates in competition with the dealer as well as the railroad, but that many mining companies have been forced to the use of trucks. L. C. Madeira, executive director of the Anthracite Institute, gave an estimate that 4,600,000 tons of anthracite is being hauled by trucks annually and said that a large part of this is stolen from the property of the coal companies by the unemployed and sold at low prices to truckers. John D. Battle, secretary of the National Coal Association, presented a mass of statistical data regarding the situation of the bituminous coal industry and its rate situation and numerous other witnesses testified that higher rates would decrease the use of coal and lead to greater use of competitive substitutes, while a large part of their evidence related to the effects on the competitive adjustment of rates which would result from the application of the proposed increases.

A large part of Tuesday afternoon was taken up with Commissioner Aitchison's efforts to keep out of the record a large part of the testimony offered or read by Cloyd W. Miller, president of the Hickory Clay Products Company, Mineral City, Ohio, who has been bombarding the newspapers, the commission, the President, and others ever since the rate petition was filed with statements attributing the business depression mainly to the fact that freight rates have not been reduced to the levels to which the depression has forced prices and generally criticizing the railroad managements and the government. He had prepared a lengthy statement, most of which Commissioner Aitchison ruled out as fast as he heard it as irrelevant, incompetent, or argumentative, but the process of explaining to Mr. Miller the difference between evidentiary facts and "curbstone reactions," hearsay, or quotations from magazines took a long time.

York Locomotive of B. & O. to Be Placed in Chicago Museum

The full-size working model of the York locomotive which the Baltimore & Ohio exhibited at a Century of Progress, has been presented to the Chicago Museum of Science and Industry. The original of the York was constructed in 1831 and was the first locomotive to be put in actual service on the Baltimore & Ohio following the demonstration of the practicability of steam power by Peter Cooper with his "Tom Thumb" locomotive in 1830. Other equipment of the Baltimore & Ohio displayed at the Fair was returned to Halethorpe, Md., in a special train.

Suspension of Refrigerator Car Tariffs Lifted

On petition of the Association of American Railroads, which made its first appearance before the commission in this proceeding, the Interstate Commerce Commission on December 3 vacated and set aside its order of October 31 in which it had suspended tariffs filed by the railroads in which they proposed to reserve to themselves the exclusive right to furnish refrigerator cars through their own ownership or through arrangements with the owners of private cars. The tariffs had been filed by the roads in compliance with the commission's findings following an investigation of practices in the handling of privately owned refrigerator cars. The commission also cancelled a hearing assigned for December 17 at Chicago in the case.

Net Deficit For Nine Months Exceeds Last Year's

Class I railroads for the first nine months of this year had a net deficit after charges of $37,065,314, according to the Interstate Commerce Commission's monthly compilation of selected income and balance-sheet items. This compares with a net deficit of $36,983,675 for the corresponding period of 1933. For the month of September there was a net deficit of $2,003,582, as compared with a net income of $17,028,325 for September, 1933. Total current assets as of September 30 amounted to $1,062,553,568, while the total current liabilities amounted to $1,396,733,539. The summary follows:

SELECTED INCOME AND BALANCE-SHEET ITEMS OF CLASS I STEAM RAILWAYS

Compiled from 143 reports (Form IBS) representing 149 steam railways

TOTALS FOR THE UNITED STATES (ALL REGIONS)

For the month of September 1934	For the month of September 1933		Income Items	For the nine months of 1934	For the nine months of 1933
$41,020,486	$60,608,882	1.	Net railway operating income	$342,609,754	$341,457,795
13,071,454	13,137,696	2.	Other income	127,206,785	129,105,921
54,091,940	73,746,578	3.	Total income	469,816,539	470,563,716
11,217,270	10,953,414	4.	Rent for leased roads	100,237,989	99,483,189
43,346,341	44,106,932	5.	Interest deductions	390,829,336	398,135,752
1,531,911	1,657,907	6.	Other deductions	15,814,528	9,928,450
56,095,522	56,718,253	7.	Total deductions	506,881,853	507,547,391
d 2,003,582	17,028,325	8.	Net income	*d 37,065,314*	*d 36,983,675*
		9.	Dividend declarations (from income and surplus):		
1,816,975	6,588,946		9-01. On common stock	62,811,128	51,366,189
.....	831,782		9-02. On preferred stock	12,663,350	11,020,928

BALANCE-SHEET ITEMS

	Selected Asset Items	Balance at end of September 1934	Balance at end of September 1933
10.	Investments in stocks, bonds, etc., other than those of affiliated companies (Total, Account 707)	$760,046,393	$754,016,191
11.	Cash	$312,122,180	$332,782,118
12.	Demand loans and deposits	38,022,965	41,092,100
13.	Time drafts and deposits	40,290,412	50,679,529
14.	Special deposits	56,568,832	38,087,148
15.	Loans and bills receivable	6,705,095	10,289,094
16.	Traffic and car-service balances receivable	50,000,473	49,922,258
17.	Net balance receivable from agents and conductors	46,236,421	44,340,749
18.	Miscellaneous accounts receivable	151,492,945	134,782,107
19.	Materials and supplies	308,288,592	292,701,207
20.	Interest and dividends receivable	44,991,559	40,931,214
21.	Rents receivable	3,510,824	2,866,915
22.	Other current assets	4,323,270	4,719,385
23.	Total current assets (items 11 to 22)	$1,062,553,568	$1,043,193,824
	Selected Liability Items		
24.	Funded debt maturing within 6 months*	$106,122,945	$120,334,739
25.	Loans and bills payable†	$295,518,049	$338,242,425
26.	Traffic and car-service balances payable	66,368,439	68,261,232
27.	Audited accounts and wages payable	217,656,119	203,258,268
28.	Miscellaneous accounts payable	62,894,999	57,837,378
29.	Interest matured unpaid	304,435,466	223,607,899
30.	Dividends matured unpaid	16,211,046	15,278,621
31.	Funded debt matured unpaid	274,433,153	98,165,292
32.	Unmatured dividends declared	1,123,121	833,523
33.	Unmatured interest accrued	107,560,626	107,756,376
34.	Unmatured rents accrued	31,451,376	29,193,062
35.	Other current liabilities	19,081,145	17,907,658
36.	Total current liabilities (items 25 to 35)	$1,396,733,539	$1,160,341,734
37.	Tax liability (Account 771):		
	37-01. U. S. Government taxes	$31,705,294	$33,292,290
	37-02. Other than U. S. Government taxes	164,192,119	179,422,282

* Includes payments which will become due on account of principal of long-term debt (other than that in Account 764. Funded debt matured unpaid) within 6 months after close of month of report.
† Includes obligations which mature less than 2 years after date of issue.
d Deficit.

"Self-Liquidating" Grade Crossing Program Suggested by Ickes

A program of grade crossing elimination to the amount of $300,000,000 to $400,000,000, to be financed by the federal government, as an important item in a big public works program for next year was suggested by Public Works Administrator H. L. Ickes, according to press dispatches from Warm Springs, Ga., on December 3, reporting an interview with Mr. Ickes following conferences with the President. Mr. Ickes was also quoted as suggesting that such a program be made "self-liquidating" by the imposition of special taxes on railroad passenger tickets, on freight, and on automobiles and gasoline. Up to date there has appeared no mimeographed official interpretation of the verbal interview.

Mr. Ickes, Relief Administrator Hopkins, Treasury officials, and others have been in conference with the President on plans for a huge public works or work-relief program for next year, which have been in process of development in Washington for several weeks. According to officials the idea is to "take up the slack" until private capital recovers from scares thrown into it by previous efforts in the same direction and by some of the numerous new schemes proposed. In all of the reports of such planning grade crossing elimination and an extensive program of low-cost housing have had a prominent place although no announcements as to the size or scope of such a program have been made and the President has warned newspaper correspondents that anything they write on the subject before his message to Congress in January is liable to be wrong. In the housing field a controversy has already arisen as to how much subsidized slum-clearance and subsistence-home construction could be undertaken by the government without interfering with the success of the Federal Housing Administration's purpose to stimulate home-building by private capital.

The reported statement by Mr. Ickes suggesting special taxes to pay back the money expended on grade crossings brings out into the open a plan which has been rumored in Washington for some time as among those under consideration. It has been understood that Mr. Ickes had been convinced that if it is desired to create much employment through grade crossing elimination it will be necessary for the federal government to finance it, but some of his advisers have been trying to find ways of getting some of the money back. One suggestion was that part of it be loaned to the railroads. Another has been that, because new roads and the growth of highway transportation have added to the grade crossing problem so rapidly, the cost might be defrayed by a special tax on motor traffic. Mr. Ickes was also quoted as saying that there are some projects which are "self-liquidating in a broader social sense" but that with the exception of certain federal projects which the government has always carried on he favored confining public works to those from which "you get your dough back."

No definite announcement as to the program is expected until about the time Congress assembles and the President is ready to go before it with his proposals for legislation and appropriations.

Railroads Organize to Expedite Grade Separation Projects

To expedite the formation of plans for the elimination of railway-highway grade crossings, made possible by the proposed setting aside of federal funds for the work, the Association of American Railroads has appointed a policy and an executive committee to function for the railroads.

The policy committee will deal with the various government departments and agencies interested in appropriations for elimination work. It consists of J. J. Pelley, president of the association; R. V. Fletcher, vice-president and general counsel; J. R. Downes, vice-president of the operations and maintenance department; M. J. Gormley, executive assistant to the president, and R. E. Dougherty, vice-president of the New York Central.

The executive committee, the members of which have been selected from various railroads, will serve as a point of contact between the railroads and the policy committee in respect to all matters pertaining to the setting aside of public funds. It has been in contact with the government officers on proposals for expediting and enlarging the program of grade separation and protection under federal grants and has furnished information regarding various projects to the Bureau of Public Roads. The members of the executive committee are: General chairman, R. H. Ford, assistant chief engineer of the Chicago, Rock Island & Pacific; W. J. Backes, chief engineer of the Boston & Maine; R. E. Dougherty, vice-president of the New York Central; W. D. Faucette, chief engineer of the Seaboard Air Line; G. W. Harris, chief engineer of the Atchison, Topeka & Santa Fe; J. L. Haugh, vice-president of the Union Pacific; C. F. Loweth, chief engineer of the Chicago, Milwaukee, St. Paul & Pacific; T. J. Skillman, chief engineer of the Pennsylvania; J. E. Willoughby, chief engineer of the Atlantic Coast Line, and S. L. Wonson, assistant chief engineer of the Missouri Pacific.

To provide a more effective contact with the highway departments of the various states as well as with the district engineers of the United States Bureau of Public Roads, chief engineers or other railway engineering officers have been selected to serve as "state chairmen" and will act as the executive committee's representatives in the various states. These state chairmen are listed in the accompanying table:

Alabama,	R. D. Tobien,	engineer m.w.,	Southern,	Birmingham, Ala.
Arizona,	M. C. Blanchard,	chief engr., coast lines,	A.T.&S.F.,	Los Angeles, Cal.
Arkansas,	R. E. Warden,	engr. pub. impvt.,	M. P.,	Little Rock, Ark.
California,	W. H. Kirkbride,	chief engr.,	Southern Pacific,	San Francisco, Cal.
Colorado,	A. Ridgway,	chief engr.,	D.&R.G.W.,	Denver, Col.
Connecticut and Rhode Island,	E. E. Oviatt,	chief engr.,	N.Y.N.H.&H.,	New Haven, Conn.
Delaware,	E. B. Temple,	chief engr.,	Pennsylvania,	Philadelphia, Pa.
Florida,	L. C. Frohman,	chief engr.,	F. E. C.,	St. Augustine, Fla.
Georgia,	H. F. Sharpley,	asst. chief engr.,	Cent. of Ga.,	Savannah, Ga.
Idaho and Utah,	B. H. Prater,	chief engr.,	O.S.L.,	Salt Lake City, Utah
Illinois,	C. F. Loweth,	chief engr.,	C.M.ST.P.&P.,	Chicago
Indiana,	I. W. Geer,	chief engr. N.W. Region,	Pennsylvania,	Chicago
Iowa,	R. H. Ford,	asst. chief engr.,	C.R.I.&P.,	Chicago
Kansas,	H. W. Wagner,	chief engr., East Lines,	A.T.&S.F.,	Topeka, Kan.
Kentucky,	G. R. Smiley,	chief engr.,	L.&N.,	Louisville, Ky.
Louisiana,	E. F. Mitchell,	chief engr.,	T.&P.,	Dallas, Tex.
Maine and New Hamp.,	W. J. Backes,	chief engr.,	B.&M.,	Boston, Mass.
Maryland,	H. A. Lane,	chief engr.,	B.&O.,	Baltimore, Md.
Massachusetts,	G. A. Kirley,	chief engr.,	B.&A.,	Boston, Mass.
Michigan,	G. H. Harris,	chief engr.,	M.C.,	Detroit, Mich.
Minnesota,	Bernard Blum,	chief engr.,	N.P.,	St. Paul, Minn.
Mississippi,	A. F. Blaess,	chief engr.,	I.C.,	Chicago
Missouri,	F. G. Jonah,	chief engr.,	St.L.-S.F.,	St Louis, Mo.
Montanna and North Dakota,	C. M. Nye,	asst. chief engr.,	G.N.,	St. Paul, Minn.
Nebraska,	H. C. Mann,	chief engr.,	U.P.System,	Omaha, Neb.
Nevada,	T. L. Phillips,	prin. asst. engr.,	W.P.,	San Francisco, Cal.
New Jersey,	A. E. Owen,	chief engr.,	C.R.R. of N.J.,	Jersey City, N. J.
New Mexico,	W. W. Kelly,	chief engr., West Lines,	A.T.&S.F.,	Amarillo, Tex.
New York,	J. W. Pfau,	chief engr.,	N.Y.C.,	New York
No. Carolina and Virginia,	J. B. Akers,	asst. chief engr.,	Southern,	Washington, D. C.
Ohio,	Hadley Baldwin,	special engr.,	C.C.C.&St.L.,	Cincinnati, Ohio
Oklahoma,	A. N. Reece,	chief engr.,	K.C.S.,	Kansas City, Mo.
Oregon,	C. F. Thomas,	res. engr.,	Southern Pacific,	Portland, Ore.
Pennsylvania,	E. B. Temple,	chief engr., E. Reg.,	Pennsylvania,	Philadelphia, Pa.
S. Carolina,	W. D. Faucette,	chief engr.,	S.A.L.,	Norfolk, Va.
S. Dakota,	H. E. Barlow,	chief engr.,	C.St.P.M.&O.,	St. Paul, Minn.
Tennessee,	G. F. Blackie,	chief engr.,	N.C.&St.L.,	Nashville, Tenn.
Texas,	C. S. Kirkpatrick,	chief engr.,	Gulf Coast Lines,	Houston, Tex.
Vermont,	R. D. Garner,	chief engr.,	Cent. Vt.,	St. Albans, Vt.
Washington,	Frederick Mears,	asst. chief engr.,	Great Northern,	Seattle, Wash.
West Virginia,	W. P. Wiltsee,	chief engr.,	N.&W.,	Roanoke, Va.
Wisconsin,	C. T. Dike,	chief engr.,	C.&N.W.,	Chicago
Wyoming,	G. J. Adamson,	chief engr.,	Union Pacific,	Omaha, Neb.

To provide a more effective contact with the highway departments of the various states as well as with the district engineers of the United States Bureau of Public Roads, chief engineers or other railway engineering officers have been selected to serve as "state chairmen" and will act as the executive committee's representatives in the various states. These state chairmen are listed in the accompanying table:

Special efforts are now being directed to the assignment of a definite P.W.A. allotment for the elimination and protection of public highway-railway grade crossings in the form of a direct grant to cover the cost of the construction work to be made available for bids and ready to contract within 30, 60 and 90-day periods. It is desired that the railways undertake promptly to ascertain and report by states and counties the number of such existing public highway-railway grade crossings on their various lines and the approximate amount of money it will cost to eliminate by grade separations or to protect these crossings and, separately, the number of crossings that can be closed, abandoned or avoided by highway relocation, the locations to include crossings of city streets and county roads, as well as state highways. In detail the information required is as follows:

(1) Ascertain by actual check the number of existing highway-railway grade

crossings by states on the various lines of railways, recommended for inclusion in such program.

(2) Classify the grade crossing locations separately for high speed and secondary traffic lines by state and county jurisdictions, in priority order of their importance for elimination with regard to relative hazard, based upon the knowledge and experience of railway operating officers.

(3) Prepare a statement for each classification of crossings in each state, showing by suitable indication the location by counties, together with the estimated cost of the work.

(4) Prepare a system map of each railway, showing high-speed heavy traffic lines, distinguished from secondary traffic lines, the purpose being to determine to what extent, if possible, it would be desirable to concentrate upon first clearing the high-speed heavy traffic routes from traffic hazards. State lines are to be indicated on this map.

Club Meeting

The Pacific Railway Club will hold its next meeting at the Transportation Club, Palace Hotel, San Francisco, on Thursday evening, December 13. This will be the annual associate members' holiday entertainment.

Valuation for Taxation

The Supreme Court of the United States holds that the Chicago & North Western was not entitled to an injunction against the treasurers of four counties in Wyoming restraining them from collecting part of the taxes levied on its property in these counties on the ground of overassessment.

The court found nothing in the record to suggest any lack of good faith of the State Board of Equalization in ascertaining the value of the property. Overvaluation resulting from mere error of judgment will not support a claim of discrimination. The ascertainment of the value of a railway system, the court said, is not governed by any fixed and definite rule. Nothing was found to show that the use which the State Board made of relative mileage to ascertain the value of the railroad's property in Wyoming was arbitrary, unreasonable or erroneous or that the property was arbitrarily overvalued. Opinion by Mr. Justice Butler. Decided Nov. 5, 1934.

New Haven to Exhibit a "Progress Special"

The New York, New Haven & Hartford will exhibit at several points along its line a special train—The Progress Special—which shows the progress of passenger car construction, having units from early designs when gas lighting was employed and from various other stages up to and including the present streamlined coach period. The train will be exhibited at Boston, Mass., December 10, later at Providence, R. I., New London, Conn., New Haven and Bridgeport. On Thursday, December 13 it will be on exhibition from 10 a.m. until 10 p.m. at Grand Central terminal, New York. Members and guests of the New York Railroad Club attending the annual dinner of the club at the Commodore Hotel on that date are invited to visit the train. The train will later be on exhibition at Waterbury, Conn., Hartford and Springfield, Mass.

Railroad Credit Corporation Has Returned 27 Per Cent

The Railroad Credit Corporation, through liquidating distributions made since the termination of its lending period in June 1, 1933, has returned $19,891,184 or 27 per cent of the net emergency freight revenues collected by it, according to a report as to its financial condition filed with the Interstate Commerce Commission. Of this amount $8,742,797 was in cash and $11,148,387 in credits on obligations due the corporation. The Railroad Credit Corporation has made twelve liquidating distributions, the last one having been made on November 30, 1934, in the amount of $1,471,386, or two per cent of the fund. Collections by the corporation in November totaled $681,971, of which $627,369, was paid in reduction of loans, $54,602, in payment of interest, and from miscellaneous sources.

Rail and Water Rate Hearing Postponed

Hearing on the case of the Pacific Coastwise Conference versus the Great Northern, et al., scheduled to have been heard on December 4 at San Francisco, before representatives of the Interstate Commerce Commission, has been postponed for 60 days on request of the conference. The conference is protesting reductions in all-rail rates from San Francisco and other California points to "Inland Empire" points, which would tend to divert traffic from the present water-rail and rail-water-rail routes. In the meantime, negotiations will be undertaken between the conference and the railroads in an effort to reach a common understanding. North Pacific ports, which have contended that an adequate differential should be maintained between all-rail and water-rail or rail-water-rail rates, had intervened in the case and in the event negotiations are not consummated satisfactorily, they will be given ample notice of a new date of hearing before the commission.

Eastern Roads Modify Baggage Charges

Many new baggage-checking conveniences free of charge, and others at substantial savings, will be offered to travelers after December 15 by railroads operating in Trunk Line and Central Passenger Association territories, according to a statement issued on December 3 by C. L. Hunter, chairman, passenger department, Trunk Line Association. The reductions and modifications will be along the lines of those which became effective December 1 on Western railroads, as reported in the *Railway Age* of November 24, page 657.

Such articles as baby carriages, go-carts, velocipedes and tricycles, which are at present considered excess baggage, will under the new set-up be handled without additional charge as regular baggage. Camping and sports equipment will be similarly treated and present restrictions as to shape and additional charges for oversize trunks will be generally abolished. Also, the maximum weight for single pieces of baggage will be increased from 250 lb. to 300 lb., but present value and weight limits on baggage transported free of charge will be continued.

The rate for transporting dogs, cats or birds will be 50 per cent lower while storage charges at stations on both trunks and hand baggage will also be considerably reduced; and the list of destinations to which baggage may be checked for delivery direct to hotels or residences "at a moderate charge" will also be greatly enlarged.

Lang Appointed Chairman of T. & N. O.

Appointment of Col. Malcolm Lang, of Haileybury, as new chairman of the Temiskaming & Northern Ontario, was announced last week in Toronto by Premier Mitchell Hepburn.

Mr. Hepburn said he would withdraw from the commission, on which he had agreed to serve only until it was organized, and that Arthur G. Slaght and Armand Racine would also drop out eventually.

Salary of the new chairman will be $10,000 a year at present as fixed by statute, the Premier said, but legislation will be introduced at the next session of the provincial Legislature to lower this amount.

Charles Gallagher will be asked to remain on the commission, the Premier said, Mr. Racine, who conducted the inquiry into the administration of the railway will continue only until reorganization is completed.

"We are entirely satisfied with the work of A. H. Cavanagh," said the Premier, referring to the recently-appointed general manager of the road.

Mediation Board Certifies Employee Representation

The National Mediation Board has issued a number of additional certifications in cases of disputes as to the organizations authorized to represent railway employees under the Railway Labor Act, as follows:

That the National Marine Engineers' Beneficial Association has been designated to represent the engine room employees of the marine department of the Reading employed at the port of New York.

That the Brotherhood of Railroad Trainmen has been designated to represent the switchmen employees of the St. Paul Bridge & Terminal yard.

That the Brotherhood of Railway and Steamship Clerks has been designated to represent the clerical and station forces of the Washington Terminal Company.

That the Dining Car Employees' Union, Local No. 372, has been designated to represent the dining and cafe car cooks of the Union Pacific system, and that the Protective Order of Dining Car Waiters, Local 465, has been designated to represent the dining car waiters of the system.

That the Railway Employees' Department, American Federation of Labor, has been designated to represent the crafts of carmen, machinists, boilermakers, black-

smiths, sheet metal workers and laborers of the New York, Chicago & St. Louis.

That the Railway Employees' Department, American Federation of Labor, has been designated to represent the mechanical department employees of the International-Great Northern and the Gulf Coast Lines.

That the American Train Dispatchers' Association has been designated to represent the train directors and operators of the Dayton Union.

Traffic Clubs Resolution Sent to President

A resolution adopted by the Associated Traffic Clubs of America at San Francisco, Calif., on June 12, in which the views of the association are expressed with reference to filling vacancies on the Interstate Commerce Commission, has been sent to President Roosevelt by the association. The resolution "declares for a return to the policy of interstate commerce regulation by and through the Interstate Commerce Commission to be composed of men chosen for their duties because of their qualifications. Regulation of interstate commerce, to be fair and successful, must be by disinterested men, properly equipped for the task, and without political prejudice or interference of any sort." The letter of transmittal, sent by President H. W. Roe, traffic manager of the Mid-Continent Petroleum Corporation, also states: "The term of Patrick J. Farrell expires at the end of this year and in filling this vacancy I sincerely trust that the views of our organization will be given your very careful and serious consideration."

3,080 Freight Cars On Order

Class I railroads of the United States on November 1 had 3,080 new freight cars on order, according to reports received by the Association of American Railroads. On the same day last year 127 new freight cars were on order and on the same date two years ago, there were 2,465. The railroads on November 1 this year also had 34 new steam locomotives and 101 new electric locomotives on order. New steam locomotives on order on November 1, 1933, totaled one, and on the same date in 1932, there were three. No figures are available to show the number of new electric locomotives on order in previous years.

In the first ten months of 1934, the railroads installed 21,671 new freight cars. In the same period last year, 1,872 new cars were placed in service and for the same period two years ago, the total number installed was 2,799. Twenty-two new steam locomotives and sixteen new electric locomotives were placed in service in the first ten months this year. The railroads in the first ten months of 1933 installed one new steam locomotive and 37 in the corresponding period in 1932.

Freight cars and locomotives leased or otherwise acquired are not included in the above figures.

Steam Railway Accident Statistics August, 1934

The Interstate Commerce Commission completed statistics of steam railway accidents for the month of August, now in preparation for the printer, will show:

Item	Month of August 1934	Month of August 1933	8 Months ended with August 1934	8 Months ended with August 1933
Number of train accidents:				
Total	479	525	4,123	3,626
(At highway grade crossings, included in total)	16	16	91	86
Number of casualties in train, train-service and nontrain accidents:				
Trespassers:				
Killed	326	334	1,853	1,889
Injured	397	541	2,251	2,877
Passengers on trains:				
Killed	2	11	17	18
Injured	205	199	1,175	1,030
Employees on duty:				
Killed	50	61	366	319
Injured	1,438	1,408	11,385	10,061
All other nontrespassers:*				
Killed	135	180	1,037	1,011
Injured	506	536	4,120	3,463
Total—All classes of persons:				
Killed	513	586	3,273	3,237
Injured	2,546	2,684	18,931	17,431

* Casualties to "Other nontrespassers" happen chiefly at highway grade crossings. Total highway grade-crossing casualties *for all classes of persons, including both trespassers and nontrespassers,* were as follows:

Killed	124	165	951	916
Injured	298	327	2,611	2,055

Rates on Non-Ferrous Metals Found Generally Reasonable

The Interstate Commerce Commission on December 5 made public its report and order in Part 12 of the general rate structure investigation, relating to rates on non-ferrous metals, finding that the rates on ores and concentrates of non-ferrous metals and on copper, lead, and zinc in the several districts throughout the United States as a whole are less than maximum reasonable rates but not less than minimum reasonable rates. In view of the existing conditions in the metals industry, no general revision is recommended at this time. The rule of the Denver & Rio Grande Western by which it establishes rates on ores and concentrates based upon gross values instead of net values was found unjust and unreasonable and the rates on copper bullion from points in Arizona, except Clarkdale, to Los Angeles Harbor, Calif., were found unreasonable. A rate of $8.50 per ton was found reasonable as a maximum. Commodity rates on copper, brass, and bronze articles between points in official territory were found to be depressed rates. Rates proposed by the carriers for application on such articles and others in I. and S. No. 3376 were found justified as maxima and the maintenance of existing rates lower than maxima to meet competition by motor trucks and water carriers was found to be justified.

Canadian Roads in October

The Canadian Pacific reported net earnings for October of $4,100,679, as compared with $4,058,447 in October of last year, an increase of $42,232. Gross for the month was $12,752,349, an increase of $767,852 over 1933, while operating expenses at $8,651,670 indicated an increase of $725,620.

For the ten months ended with October, net earnings amounted to $17,770,786, as compared with $14,029,898 for the same period of 1933, representing an increase of $3,740,888. Gross for the ten-month period was $103,652,668, an increase of $9,685,641 over last year, while operating expenses at $85,881,881 showed an increase of $5,944,753.

Following are comparative gross earnings, expenses and net earnings for the month of October and for the ten months ended with October:

OCTOBER

	1934	1933	Inc.
Gross	$12,752,349	$11,984,497	$767,852
*Exp.	8,651,670	7,926,050	725,620
Net	$4,100,679	$4,058,447	$42,232

TEN MONTHS

	1934	1933	Inc.
Gross	$103,652,668	$93,967,027	$9,685,641
Exp.	85,881,881	79,937,128	5,944,753
Net	$17,770,786	$14,029,898	$3,740,888

* Includes pensions.

The earnings statement of the Canadian National for October shows substantial increases in gross and net earnings as compared with last year. Gross for the month was $15,803,292, a gain of $1,140,978 over 1933, while net earnings rose from $2,542,586 to $2,809,429, an increase of $266,844.

For the ten months of 1934 ended with October, a similar showing is reported. Gross for the period was $137,766,001, an increase of $14,887,407 over a year ago. Expenses rose by $8,385,431 to $127,814,067, leaving ten months' net at $9,951,934, an increase of $6,501,976 over the $3,449,958 reported for the first ten months of 1933.

Following are comparative gross earnings, expenses and net earnings for the month of October, and for the ten months:

OCTOBER

	1934	1933	Inc.
Op. rev.	$15,803,292	$14,662,314	$1,140,978
*Op. exp.	12,993,863	12,119,728	874,134
Net rev.	$2,809,429	$2,542,586	$226,844

TEN MONTHS

	1934	1933	Inc.
Op. rev.	$137,766,001	$122,878,594	$14,887,407
*Op. exp.	127,814,067	119,428,636	8,385,431
Net rev.	$9,951,934	$3,449,958	$6,501,976

* Includes pensions.

I. C. C. Regulations for Transport of Dangerous Articles by Truck

Having found in a law passed back in 1921, an amendment to the transportation of explosives act, a certain measure of jurisdiction over motor trucks, the Interstate Commerce Commission has just issued a series of regulations, to become effective on March 1, 1935, governing the transportation of explosives and other dangerous articles on public highways by motor truck or other vehicle, including specifications for shipping containers. Unlike most of the laws administered by the commission, which apply generally to common carriers by railroad, this law applies to "common carriers engaged in interstate or foreign commerce." Following hearings held earlier in the year pursuant to an

order of May 7, the commission has prescribed the regulations "to minimize the dangers to life and property incident to the necessary transportation on public highways of explosives and other dangerous articles, by motor trucks or other vehicles of common carriers engaged in interstate or foreign commerce." It is made the duty of each such carrier, and of each shipper of such articles via such carriers, to make the regulations effective and to fully instruct their employees in relation thereto. "The transportation of dangerous explosives," the regulations say, "on public highways by motor truck or other vehicle presents hazards to the public which are peculiar to this service and should be avoided by every practicable means. The regulations herein are general in character, and are minimum requirements. The different states, cities, or other proper authorities may therefore attach additional requirements that are not inconsistent with the regulations herein published."

Need for Truck Regulation in Canada Cited

Highway transportation in competition with Canadian railways has a field of its own and is here to stay, but concurrent with this development truck transport will require its own type of regulation, S. W. Fairweather, director of the Bureau of Economics of the Canadian National Railways, declared in an address before the Traffic Club in Montreal last week.

Asserting that Canada's railway development has been amply justified by the resulting growth of national wealth, and in this sense there is no railway problem, Mr. Fairweather expressed faith that the volume of traffic in the country will return to pre-depression levels, and said that because the railway is from the engineering standpoint the most efficient form of land transportation, it must remain in the future as it has in the past the dominant feature of such transport in Canada.

In what he termed "a new deal for the railways under modern conditions," Mr. Fairweather said future developments will include streamlined trains, air-conditioning, re-drafting of rate structures, speeding of schedules, special consideration to consistent patrons, block contracts for specific shippers without regard to distance, and specialized service for individual users.

But while railways will thus develop despite the growth of highway transportation, Mr. Fairweather felt truck traffic needs regulation in regard to public safety and the assessing of highway construction and maintenance costs on a fair basis to the users, and as a corollary that where highway transport comes in conflict with railway transport, the railway should be relieved of regulatory restrictions with regard to discrimination and the so-called fair and reasonable rate.

With the introduction of highway competition, Mr. Fairweather confessed that the railways were at first slightly bewildered at the speediness of the onslaught. But since it is here to stay, the measure of the railway's ultimate success depends on the degree of intelligence with which they meet the problem, he said.

Construction

New York State Crossing Program

The Public Service Commission of New York has announced its list of highway grade crossings on the railroads of the state which are to be considered for elimination during 1935. The list includes projects on which the total estimated cost of the required work is $55,344,200, of which all but $1,375,500 applies to crossings carried over from 1934. The new projects are listed below:

CROSSING	TOWN OR CITY	ESTIMATED COST
	New York Central	
County Rd.	Copake	$85,000
McAlpin	Lynns Falls	105,000
Burtons-Wellington	Nelson	8,000
Statt	Gates	138,000
Railroad Ave.	Macedon	165,000
	Pennsylvania	
Various	Caneadea	150,000
	Delaware & Hudson	
Various	Saranac Lake and Harrietstown	125,000
	Baltimore & Ohio	
Various	Buffalo	300,000
	Lehigh Valley	
Dingens	Buffalo	299,500
Estimated cost of new projects		$1,375,500

The projects carried over from the 1934 program follow:

CROSSING	TOWN OR CITY	ESTIMATED COST
	New York Central	
Ridge Rd.	West Seneca	$100,000
Various	Batavia	3,502,000
Various	Alexander	6,000
East	Hilton	280,000
Verona	Verona	170,000
Various	Phelps	421,000
Bairds	DeKalb	100,000
Congress	Schenectady	200,000
Ashford	Dobbs Ferry	300,000
Various	Attica	5,000
Various	Mt. Kisco	1,250,000
Manville	Pleasantville	650,000
	New York Central—Delaware & Hudson	
George	Green Island	250,000
	N. Y. C.—Erie—L. V.—D. L. & W.	
Central	Lancaster	800,000
	New York Central—Erie	
Various	Niagara	12,500,000
	New York Central—New York, Ontario & Western	
Various	Volney	50,000
	Pennsylvania—Baltimore & Ohio	
Chili	Rochester	500,000
	Long Island	
Various	Rockville Center, and Lynbrook	4,330,000
Various	Floral Park	3,000,000
Various	Freeport	5,150,000
Various	Garden City	2,700,000
Various	Babylon	2,150,000
	Delaware & Hudson	
Various	Corinth	33,500
Various	Ballston Spa, Saratoga Springs, Wilton North Umberland and Moreau	8,225,000
Various	Watervliet	250,000
	Erie	
Various	Dunkirk	1,200
Mechanic	Lancaster	5,000
County Rd.	Alexander	10,000
Various	Walkill	175,000
	Lehigh Valley	
Clifton	Batavia	10,000
So. Jackson	Batavia	200,000
West Rush	Rush	125,000
	Delaware, Lackawanna & Western	
Pavilion-Canawaugus	Pavilion	100,000
	Troy Union and Boston & Maine	
City Streets	Troy	6,410,000
Estimated cost of projects carried over from 1934 program		$53,958,700
Estimated cost of new projects in 1935 program		1,375,500
Grand Total		$55,334,200

DELAWARE & HUDSON.—A contract has been given to Foley Brothers, Inc., New York, for eliminating the grade crossing on this road at Windsor, N. Y., to cost $119,037.

PENNSYLVANIA.—This road has given a contract to the Empire Construction Company, Baltimore, Md., for the reconstruction of bridge No. 28.11 over Harmon's Run, Townsend, Del.

Equipment and Supplies

LOCOMOTIVES

THE PIRAEUS-ATHENS-PELOPONNESUS is negotiating a loan of about $1,000,000 from the Grecian government, the funds to be spent for roadbed improvements and the purchase of rolling stock, according to recent reports received by the U. S. Department of Commerce. The equipment to be purchased includes six locomotives of the 2-8-0 type with separate tenders, or, instead of these locomotives, motor rail cars of 300 hp. may be purchased; 7 motor rail cars of 120 to 150 hp., 108 steel box cars, 10 first class passenger cars, 8 second class passenger cars, and 5 to 10 baggage cars. In addition some tools, rails and bridge material will be purchased. Georges J. Doumas, Athens, Greece, is general manager.

FREIGHT CARS

THE NATIONAL RAILWAYS OF MEXICO has placed an order with the Pullman Car & Manufacturing Corporation for 800 standard-gage box, 200 narrow-gage box and 200 standard-gage gondola cars.

IRON AND STEEL

THE CHICAGO, BURLINGTON & QUINCY is inquiring for 165 tons of structural steel for bridge work at Golden, Ill.

DELAWARE & HUDSON.—A contract has been let to the American Bridge Company for 150 tons of steel by the Wilson & English Construction Company, New York, who have the contract for grade crossing elimination work on this road at Duanesburg, N. Y.

SIGNALING

THE NEW YORK CENTRAL has been ordered to install additional flashing light signals and other material at various crossings in the city of Franklin, and in Perry, Pine Grove and Warren, Pa., at an estimated expense of $1,524. This order has been issued by the Pennsylvania Public Service Commission, following an agreement between the railroad company and the public authorities, and the state commission appropriates $762, approximately one-half of the cost, to be paid by the state treasury.

Financial

ATCHISON, TOPEKA & SANTA FE.—*Abandonment.*—This road has been permitted by the Interstate Commerce Commission to abandon that portion of its line extending from Medicine Lodge, Kans., to Gerlane, 7.59 miles.

ATLANTIC COAST LINE.—*Bonds.*—The Interstate Commerce Commission has authorized this road to procure the authentication and delivery of not exceeding $6,500,000 of its series A 4½ per cent general unified mortgage 50-year gold bonds in reimbursement for expenditures made in the retirement of a like amount of underlying bonds of its subsidiary, the Savannah, Florida & Western. Commissioner Porter, dissenting, was unable to bring himself "to consent to the issuance of bonds on the part of this railroad company, to run for 50 years with no provision whatsoever for their payment or reduction before they are finally due, particularly in view of the fact that the ratio of bonds to stock is now 65 to 35."

CHICAGO & EASTERN ILLINOIS.—*Hearing on Reorganization Postponed.*—The hearing before Oliver E. Sweet, director of the Bureau of Finance of the Interstate Commerce Commission, on a proposed plan of reorganization for this company, set for December 3 at Washington, has been postponed until February 5 at the request of counsel for the company to await the results of litigation over the order issued by Co-ordinator Eastman prohibiting the Louisville & Nashville from terminating its interchange of passenger equipment in the Chicago-Florida service with the C. & E. I. and transferring it to the New York Central.

CHICAGO & NORTH WESTERN.—*Abandonment.*—This road has been authorized by the Interstate Commerce Commission to abandon its Zumbrota branch extending from its main line at a point near Rochester, Minn., to Zumbrota, approximately 24.5 miles.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC.—*Abandonment.*—This road has been authorized by the Interstate Commerce Commission to abandon a 15.84-mile line extending from a point near Babcock, Wisc., to Norway.

CHICAGO, ROCK ISLAND & PACIFIC.—*Abandonment.*—The trustees have applied to the Interstate Commerce Commission for authority to abandon the line of the White & Black River, from Wiville, Ark., to Gregory, 5.9 miles.

CHICAGO, ROCK ISLAND & PACIFIC.—*Payment of Notes.*—Trustees of the Chicago, Rock Island & Pacific have filed a petition in the Federal District Court at Chicago, asking permission to defer the payment of principal on maturing equipment trust certificates, but to continue interest payment on all certificates whether matured or not.

ERIE.—*Extension of R. F. C. Loan.*—The Interstate Commerce Commission, finding that this road is not in need of financial reorganization at the present time, has approved the extension for another six months of a loan of $2,775,000 from the Reconstruction Finance Corporation which matured on November 30. The approval is conditioned upon the Erie's depositing with the R. F. C. binding commitments that its bank loans outstanding in the amount of $2,575,000 will be extended to maturity dates not later than the extended maturity date of the R. F. C. loan.

GREAT NORTHERN.—*P. W. A. Loan.*—The Interstate Commerce Commission has approved certain modifications in the maintenance program being carried out by this road with the aid of a loan from the Public Works Administration. The net effect of the adjustments is to reduce the estimated total cost of the program from $5,125,985 to $4,935,368 but the amount borrowed from the P. W. A. remains unchanged.

GULF, MOBILE & NORTHERN.—*Pledge of Collateral with R. C. C.*—The Interstate Commerce Commission has authorized this road to pledge with the Railroad Credit Corporation as collateral security for loans, not exceeding $900,000 of its first mortgage gold bonds, series C. The collateral involved had previously been pledged with the Reconstruction Finance Corporation and only the G. M. & N. equity in it was pledged with the R. C. C. Since the R. F. C. has now released the bonds, the R. C. C. required that they be pledged with it in consideration for the renewal of a G. M. & N. note.

HILLSBORO & NORTH-EASTERN.—*Approval of R. F. C. Loan Denied.*—The Interstate Commerce Commission has for the second time refused to approve the application of this road for a loan from the Reconstruction Finance Corporation, holding that it is unable to find that the latter would be adequately secured by the pledge of collateral offered. The amount sought was $12,000, whereas in the previous application which was denied on July 27, 1933, the applicant requested approval of a $15,000 loan.

ILLINOIS CENTRAL.—*Bonds of the Dubuque & Sioux City.*—The Dubuque & Sioux City has been authorized by the Interstate Commerce Commission to issue $6,000,000 of debenture bonds to be delivered at par to the Illinois Central in reimbursement for money advanced or expenditures made for additions and betterments to the applicant's property.

ILLINOIS CENTRAL.—*R. F. C. Loan.*—The Interstate Commerce Commission has approved the application of this company for permission to borrow an additional $4,000,000 from the Reconstruction Finance Corporation for the payment of interest and taxes due in December and January. As a necessary preliminary to the approval, the Commission found that the public interest does not at this time require a financial reorganization of the applicant carrier.

LEHIGH VALLEY.—*Collateral for R. F. C. Loan.*—The Interstate Commerce Commission has modified a previous certificate so as to relieve this road from the requirement that it include $500,000 of Seneca County Railway 5 per cent mortgage bonds of 1983 among collateral delivered to the R. F. C. for a loan of $3,000,000.

LOUISVILLE & NASHVILLE.—*Operation of Tennessee Western.*—This road has been authorized by the Interstate Commerce Commission to continue its operation of the line of the Tennessee Western under a new operating contract which will expire on October 31, 1938.

NEW YORK CENTRAL.—*Abandonment.*—The Interstate Commerce Commission has authorized the abandonment by this road of its Cambria branch extending from a connection with its main line at Cambria, N. Y., to Pekin, 3.65 miles.

PITTSBURGH & WEST VIRGINIA.—*Fails to Pay Interest.*—This company defaulted on the December 1 interest payment due on its $3,000,000, series A, 4½ per cent first mortgage bonds of 1958.

PITTSBURGH & WEST VIRGINIA.—*R. F. C. Loan.*—The Interstate Commerce Commission has approved conditionally the application of this road for permission to borrow an additional $500,000 from the Reconstruction Finance Corporation to be used in paying the final installment of principal on equipment obligations which matured November 1, and for unpaid vouchers carried over from the months of March to September. In approving the application the Commission found that the road is not at present in need of financial reorganization in the public interest but conditioned its approval upon the unconditional guarantee by the Pennroad Corporation of repayment of principal and the punctual payment of interest, pointing out that the Pennroad Corporation which owns approximately three-fourths of the stock of the applicant "will be the chief beneficiary of any loan approved."

SOUTHERN PACIFIC.—*Acquisition.*—This company has applied to the Interstate Commerce Commission for authority to acquire by purchase of stock the property of the Interurban Electric Railway in San Francisco and Alameda counties, Calif., including ferries, and to transfer a part of its electric passenger service to the line of the Interurban.

WABASH.—*P.W.A. Loan.*—Receivers of this road have applied to the Public Works Administration for a loan of $2,350,000 for the completion of a bridge across the Missouri River at St. Charles, Mo.

Average Prices of Stocks and of Bonds

	Dec. 4	Last week	Last year
Average price of 20 representative railway stocks..	37.40	36.93	38.78
Average price of 20 representative railway bonds..	74.35	74.65	64.80

Dividends Declared

Boston & Providence.—$2.12½, quarterly, payable January 2 to holders of record December 20.

Dayton & Michigan.—8 Per Cent Preferred. $1.00, payable January 2 to holders of record December 16.

Lackawanna R. R. of N. J.—4 Per Cent Guaranteed, $1.00, quarterly, payable January 2 to holders of record December 7.

Morris & Essex.—$1.75, payable January 2 to holders of record December 7.

New York, Lackawanna & Western.—5 Per Cent Guaranteed, $1.25, quarterly, payable January 2 to holders of record December 14.

Railway Officers

EXECUTIVE

C. Spencer, a director of the Pacific Great Eastern, has been elected vice-president, with headquarters at Vancouver, B. C., succeeding the late **W. J. Blake-Wilson.**

John W. Rimmer, whose appointment as vice-president in charge of traffic for the Boston & Maine and the Maine Central, with offices at Boston, Mass., and Portland, Me., was noted in the *Railway Age* of December 1, entered the service of the Boston & Maine 27 years ago as an office boy, after being graduated from Malden High School. He was advanced successively to clerk, secretary to the freight traffic manager, traveling freight agent, assistant general freight agent, assistant to the vice-president, assistant freight traffic manager, freight traffic manager and general freight traffic

John W. Rimmer

manager. He has been head of the freight department of the Boston & Maine since July, 1930, and has been associated with the Maine Central since February, 1933.

Edward H. Bunnell, chief accounting officer of the St. Louis-San Francisco, has been appointed vice-president in charge of the department of Finance, Accounting, Taxation and Valuation of the Association of American Railroads. Mr. Bunnell was born in Trinidad, Colo., on February 17, 1882, and was graduated from Trinidad Business College in 1899. He entered railway service in September, 1900, as a car clerk in the mechanical department of the Atchison, Topeka & Santa Fe. He served in various other capacities with that road including that of chief clerk of the accounting department, special accountant and chief clerk to the auditor of disbursements and as auditor of disbursements. Mr. Bunnell, on May 1, 1919, became general auditor of the St. Louis-San Francisco. In June, 1922, his title was changed to controller, at which time he also become controller of the Muscle Shoals, Birmingham & Pensacola. In November, 1932, his title was changed to chief accounting officer of the St. Louis-San Francisco, from which

E. H. Bunnell

position he has just resigned to accept the position as vice-president of the Association.

OPERATING

A. F. Barclay, chief engineer maintenance of way and structures of the New Orleans Public Belt, has been appointed general manager, with headquarters as before at New Orleans, La., succeeding **Frank H. Joubert,** deceased.

J. L. Knight, auditor of the Midland Railway Company of Manitoba, has been appointed also general superintendent and general freight and passenger agent, with headquarters as before at Winnipeg, Man. **C. E. Dafoe,** general superintendent and general freight and passenger agent, has retired.

J. J. Daley, assistant division superintendent and supervisor of track for the New York Central at Alliance, Ohio, has been appointed superintendent of the Ohio Central division, with headquarters at Columbus, Ohio. **C. M. McVay** has been appointed assistant superintendent of the Cleveland division, with headquarters at Alliance, Ohio.

George N. Slade, assistant superintendent of the Lake Superior division of the Northern Pacific, whose promotion to superintendent of the Yellowstone division, with headquarters at Glendive, Mont., was noted in the *Railway Age* of November 24, has been connected with the Northern Pacific for nine years. He was born in July, 1902, at Englewood, N. J., and was educated at the Sheffield Scientific School, Yale University. He entered railway service in February, 1925, in the engineering department of the Northern Pacific, serving as a chainman and a rodman until 1926, when he was advanced to assistant roadmaster at Duluth, Minn. Later in the same year Mr. Slade was transferred to the operating department as assistant trainmaster at Helena, Mont., being promoted to trainmaster at Jamestown, N. D., in 1927. In 1928, he was transferred to Minneapolis, Minn., and in the following year he was appointed superintendent of ore operations, with headquarters at Superior, Wis. In January, 1933, Mr. Slade was promoted to assistant superintendent with headquarters at Duluth, Minn., the position he was holding at the time of his recent appointment as superintendent.

TRAFFIC

C. P. Wilson, general northern agent for the Fort Smith & Western, with headquarters at Chicago, has had his title changed to assistant general freight agent.

Percy M. Buttler, general agent of the Canadian National at Ottawa, has retired at the age of 60. Mr. Buttler was appointed general agent in December, 1920.

C. J. Hendrickson, district coal agent for the Pennsylvania at New York, has been appointed coal freight agent with the same headquarters.

W. H. Larsen, traveling freight agent for the Kansas City Southern, with headquarters at Ft. Worth, Tex., has been appointed general agent with headquarters at Texarkana, Tex.

R. N. Nash, freight traffic manager of the St. Louis-San Francisco, has been appointed assistant to A. F. Cleveland, vice-president in charge of the traffic department of the Association of American Railroads, with office at Washington, D. C. Mr. Nash has been with the St. Louis-San Francisco since 1913, and since 1932 has been general freight agent, assistant freight traffic manager, and freight traffic manager.

B. H. Stanage, traffic manager on the St. Louis-San Francisco, has been promoted to freight traffic manager, with headquarters as before at St. Louis, succeeding **R. N. Nash,** who has been appointed assistant to the vice-president in charge of traffic for the Association of American Railroads. **G. L. Oliver,** traffic manager of the Texas lines of the Frisco, with headquarters at Fort Worth, Tex., has been appointed assistant freight traffic manager at St. Louis. **S. C. Inkley** has been appointed to the newly-created position of assistant general freight agent in charge of commerce work, with headquarters at St. Louis.

Edwin S. Stephens, freight traffic manager of the Chicago & Eastern Illinois, has been appointed to the newly-created position of general traffic manager, with headquarters as before at Chicago. Mr. Stephens has been in railway service for 42 years, about 25 of which have been with the Chicago & Eastern Illinois. He was born on August 21, 1874, at Kansas City, Mo., and entered railway service in 1892 as a clerk with the Kansas City, Fort Scott & Memphis (now part of the St. Louis-San Francisco). In the following year he went with the Atchison, Topeka & Santa Fe as a timekeeper in the shops at Albuquerque, N. M., later serving as clerk in the auditor's office and stenographer in the transportation department, with the same headquarters. Later he served

as division clerk and chief clerk at Gallup, N. M. In 1898, Mr. Stephens returned to the Kansas City, Fort Scott & Memphis as secretary to the president. From 1900 to 1903, he served as chief clerk in the office of the president of this company and later in the same capacity on the St. Louis-San Francisco, with headquarters at St. Louis, Mo. At the end of this period he was appointed a commercial agent on the Frisco at Kansas City, which position he held until 1908, when he left this company to go with the Chicago & Eastern Illinois as freight claim agent at Chicago. Two years later Mr. Stephens was appointed general agent on the C. & E. I. and the Frisco at Chicago, and in 1912 he was made assistant general freight agent of the C. & E. I. with the same headquarters. In January, 1917, he was advanced to general freight agent, holding this position until 1933, when he was appointed to the newly-created position of freight traffic manager.

J. B. McCorkle, who has been appointed general freight agent on the Pennsylvania, with headquarters at Pittsburgh, Pa., as noted in the *Railway Age,* of November 24, has been connected with this company for about 30 years. He was born on April 8, 1884, at Winterrowd, Ill., and was educated at Nebraska Normal College. He entered railway service in 1904 as a clerk in the local office of the Vandalia (now part of the Pennsylvania) at Effingham, Ill., from which position he resigned in the following year. Mr. McCorkle reentered the service of this company in 1906 as assistant tariff clerk in the general freight office at St. Louis, Mo. From 1907 to 1924 he served as tariff clerk, percentage clerk, freight solicitor in the commercial office, chief rate clerk in the general freight office, chief clerk to the freight traffic manager, chief of rate bureau, and chief clerk to the traffic manager at Pittsburgh, Pa. At the end of this period he was appointed division freight agent at Terre Haute, Ind., and in January, 1926, he was transferred to Cleveland, Ohio. On November 1, 1927, he was promoted to coal and ore agent with the same headquarters, and in March, 1929, he was appointed general coal freight agent at Pittsburgh, being advanced to coal traffic manager at the same point in 1930. Later he was reappointed general coal freight agent at Pittsburgh, which position he was holding at the time of his recent appointment.

J. B. McCorkle

ENGINEERING AND SIGNALING

J. M. Fair, whose appointment as engineer maintenance of way for the Pennsylvania at Pittsburgh, Pa., was noted in the *Railway Age* of October 20, was born at Carlisle, Pa., on September 21, 1886, and received his higher education at Lehigh University, from which he was graduated in 1908 with the degree of C.E. He entered railway service with the Pennsylvania in April, 1910, as a rodman at Philadelphia, Pa., and, after holding this position at various points, he was appointed transitman in February, 1915. On October 7 of that same year he was appointed assistant supervisor of track of the Baltimore division, with headquarters at Baltimore, Md., and in August of the following year he was transferred in the same capacity to the office of the engineer maintenance of way at Philadelphia. In May, 1920, he was promoted to supervisor of the staff of the chief engineer, and in July, 1924, became a division supervisor on the Cumberland Valley division. He was transferred to the Philadelphia Terminal division in August, 1926, and in January, 1927, was appointed to the staff of the general manager of the Eastern Region, with headquarters at Philadelphia. In January of the following year he was made division engineer of the Buffalo division, with headquarters at Buffalo. In February, 1930, he was made division engineer of the Long Island, with headquarters at Jamaica, N. Y., which position he was holding at the time of his recent promotion to engineer maintenance of way.

J. M. Fair

SPECIAL

J. A. Burke has been appointed supervisor of fire prevention of the Pere Marquette, with headquarters at Detroit, Mich.

D. M. Neiswanger, whose appointment as manager of the new department of statistics and research of the New York, New Haven & Hartford was noted in the *Railway Age* of December 1, page 753, was born on June 12, 1889, at Topeka, Kan. After graduation from Washburn College, where he was awarded the degree of B. A. in 1911, Mr. Neiswanger entered the Graduate School of Business Administration of Harvard University, graduating in 1914, with the degree of M. B. A. During summer vacations he worked in the engineering and stores departments of the Sante Fe. Immediately after being graduated from Harvard he entered the service of the New Haven, as traveling agent in the bureau of station service at Boston, Mass. In August of the following year he was transferred to New Haven, Conn. as secretary and statistician for the committee on electrical operations, and continued in that position until May, 1917, when he was sent to New York as chief transportation clerk to the general superintendent in charge of the New York division of the New Haven and the New York Connecting. In November, 1918, Mr. Neiswanger was recalled to New Haven to be statistician to the Federal manager. In September, 1925, he was appointed assistant to general manager in charge of the expense budget, special studies and operating statistics, and held that position until his recent appointment.

D. M. Neiswanger

OBITUARY

George Helme, general agent for the Kansas City Southern, with headquarters at Texarkana, Tex., died on November 19.

Roy E. Comfort, formerly general superintendent of transportation on the National Railways of Mexico, died on November 30 at the age of 81 years. Mr. Comfort was born in Cuba, N. Y., and entered railway service in January, 1877, as a clerk on the Atchison, Topeka & Santa Fe. After serving in various positions with this company, he went with the Mexican Central (now part of the National of Mexico) in 1883, where he served as division superintendent at various points. In 1908, after a short period of service with the Interoceanic Railway of Mexico (now also part of the National of Mexico), Mr. Comfort was appointed general superintendent of narrow-gage lines for the National Railways of Mexico. Two years later he was made general superintendent of transportation of the Southern Grand division of the National of Mexico.

Revenues and Expenses of Railways

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1934

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of: Way and structures	Equipment	Traffic	Transportation	General	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income	Net ry. operating income, 1933
Akron, Canton & Youngstown	Oct.	171	$128,131	$40	$136,256	$25,975	$11,293	$7,285	$45,232	$10,583	$100,368	73.7	$35,888	$25,870	$15,041	$21,455
	10 mos.	171	1,355,708	375	1,443,980	215,528	144,357	75,635	438,962	85,574	959,453	66.4	484,527	380,125	234,595	273,705
Alton	Oct.	949	916,389	156,755	1,234,278	220,780	172,346	44,558	445,878	40,416	936,744	75.9	297,534	221,593	50,522	208,522
	10 mos.	950	8,180,658	1,455,288	11,156,714	1,765,536	1,669,811	452,261	4,289,598	418,097	8,702,035	78.0	2,454,679	1,722,839	280,435	1,418,336
Atchison, Topeka & Santa Fe	Oct.	9,532	8,103,171	822,104	9,783,611	1,226,806	2,552,826	315,533	3,296,043	537,037	7,941,806	81.2	1,841,805	1,075,423	1,118,115	2,241,594
	10 mos.	9,539	73,211,711	9,283,030	90,422,005	11,111,096	21,924,584	3,055,631	30,289,081	4,113,982	70,538,655	78.0	19,883,350	12,011,886	13,025,649	10,021,001
Gulf, Colorado & Santa Fe	Oct.	1,918	1,087,657	49,921	1,220,779	202,599	189,980	40,664	442,215	81,633	957,063	78.4	263,716	181,396	105,539	192,575
	10 mos.	1,918	8,830,084	483,170	10,066,468	1,900,490	2,209,924	451,255	3,870,135	674,612	9,103,467	90.4	963,001	133,590	—597,007	—340,354
Panhandle & Santa Fe	Oct.	1,878	760,878	24,219	838,002	75,249	123,371	15,539	234,957	42,141	491,037	58.6	346,965	304,317	271,739	277,664
	10 mos.	1,878	6,785,157	251,314	7,514,261	846,502	1,372,512	165,313	2,126,623	345,395	4,855,385	64.6	2,658,876	2,214,536	1,540,797	979,924
Atlanta & West Point	Oct.	93	86,128	18,760	126,670	16,143	24,545	6,869	50,093	6,464	106,666	84.2	20,004	12,801	—1,939	—15,644
	10 mos.	93	808,265	171,707	1,171,488	191,084	261,518	67,132	492,522	75,688	1,110,144	94.8	61,344	—10,809	—119,255	—184,930
Western of Alabama	Oct.	133	84,693	19,760	119,950	19,739	28,781	6,630	45,511	5,778	108,502	90.5	11,448	3,451	7,327	—15,683
	10 mos.	133	766,461	177,445	1,079,081	200,218	306,185	67,680	440,784	68,179	1,100,663	102.0	—21,582	—101,630	—39,040	—80,659
Atlanta, Birmingham & Coast	Oct.	639	180,709	7,535	217,281	44,102	45,036	20,784	94,758	20,811	236,496	108.8	—19,215	—31,799	—38,943	—32,704
	10 mos.	639	2,001,601	68,827	2,352,578	410,758	497,836	211,093	981,513	174,535	2,373,804	100.9	—21,226	—147,002	—254,290	—215,185
Atlantic Coast Line	Oct.	5,147	2,144,155	250,724	2,730,538	379,866	655,445	112,900	1,175,132	129,183	2,470,963	90.5	259,575	128,725	115,978	145,423
	10 mos.	5,145	24,968,756	4,261,775	33,041,518	4,193,506	6,573,084	1,120,550	12,358,260	1,285,110	25,813,032	78.1	7,228,486	3,891,471	3,276,467	3,354,398
Charleston & Western Carolina	Oct.	342	136,228	1,825	143,461	22,139	23,547	5,870	50,492	4,945	106,993	74.6	36,468	26,960	29,234	20,032
	10 mos.	342	1,556,091	14,114	1,613,850	231,132	246,183	56,536	530,423	48,015	1,112,289	68.9	501,561	338,928	319,540	368,760
Baltimore & Ohio	Oct.	6,445	9,400,307	845,054	11,035,589	940,325	1,991,985	343,826	3,980,935	564,308	7,912,242	71.7	3,123,347	2,537,436	1,999,673	3,003,893
	10 mos.	6,391	98,596,218	8,561,782	114,707,185	10,080,295	23,982,222	3,552,867	39,728,958	5,595,995	83,911,978	73.2	30,795,207	24,164,522	20,306,229	25,683,329
Staten Island Rapid Transit	Oct.	23	50,238	73,591	132,558	14,905	15,212	1,543	75,061	12,670	119,391	90.1	13,167	—3,483	—33,818	725
	10 mos.	23	516,285	819,775	1,419,890	119,429	132,763	17,125	803,186	128,726	1,201,229	84.6	218,661	59,904	—123,038	30,372
Bangor & Aroostook	Oct.	603	620,778	12,360	652,383	78,759	88,433	4,483	123,282	33,446	329,096	50.4	323,287	258,806	263,054	195,534
	10 mos.	603	4,639,794	234,047	5,059,843	934,632	874,329	47,460	1,177,882	253,651	3,296,477	65.2	1,763,366	1,337,933	1,346,995	1,401,487
Bessemer & Lake Erie	Oct.	225	770,268	680	777,330	63,001	294,119	10,943	150,082	46,466	564,585	72.6	212,745	171,047	177,324	88,944
	10 mos.	225	7,331,969	7,267	7,417,608	1,040,189	2,793,219	110,112	1,443,681	375,499	5,761,170	77.7	1,656,438	1,366,065	1,459,214	1,690,953
Boston & Maine	Oct.	2,038	2,581,572	480,032	3,588,199	395,947	420,921	62,997	1,434,596	173,285	2,496,173	69.6	1,092,026	883,925	715,954	600,391
	10 mos.	2,048	24,496,952	5,708,088	35,317,096	5,022,409	5,195,386	600,097	14,170,540	1,688,846	26,774,093	75.8	8,543,003	6,534,713	4,908,123	6,193,019
Brooklyn Eastern District Terminal	Oct.	11.27	86,280	.....	88,510	4,998	12,867	301	25,058	5,889	49,113	55.4	39,397	32,800	32,800	31,815
	10 mos.	11.27	785,637	.....	806,280	45,579	89,169	3,338	260,021	52,207	450,314	55.8	355,966	290,512	290,512	296,618
Burlington-Rock Island	Oct.	280	84,673	3,164	92,588	15,458	13,541	4,045	44,520	9,382	86,912	93.9	5,676	—18,357	—8,377	38,234
	10 mos.	280	602,326	25,149	670,416	130,148	131,901	38,688	382,470	78,390	761,559	113.6	—91,143	—159,097	—225,643	—41,798
Cambria & Indiana	Oct.	37	97,916	.....	98,281	10,501	120,518	377	22,064	6,367	159,827	162.62	—61,546	—66,360	4,537	68,690
	10 mos.	37	865,223	.....	867,435	79,066	504,576	3,834	127,901	67,539	782,916	90.25	84,519	—43,895	607,977	780,133
Canadian Pacific Lines in Maine	Oct.	233	97,954	10,568	117,625	27,758	31,271	8,990	52,625	5,497	127,024	108.0	—9,399	—15,399	—29,876	—3,632
	10 mos.	233	1,379,514	160,356	1,671,976	345,620	307,904	88,305	651,458	56,210	1,456,332	87.1	215,644	151,602	—49,578	—100,920
Canadian Pacific Lines in Vermont	Oct.	85	56,747	8,744	79,258	17,010	19,278	3,996	51,635	4,573	96,776	122.1	—17,518	—22,622	—37,736	—33,336
	10 mos.	85	537,088	103,904	786,843	158,122	198,111	39,354	527,589	44,640	970,752	123.3	—183,909	—234,928	—398,707	—336,135
Central of Georgia	Oct.	1,926	951,177	81,926	1,159,641	111,249	204,087	49,623	450,676	92,370	910,668	78.5	248,973	175,837	141,569	61,481
	10 mos.	1,926	8,909,944	951,291	11,132,754	1,315,610	2,426,819	487,033	4,429,770	759,720	9,464,352	85.0	1,668,402	937,045	560,346	600,733
Central New Jersey	Oct.	689	1,997,937	332,565	2,506,337	137,680	270,519	41,886	966,630	136,121	1,568,450	62.6	937,887	357,059	279,994	80,718
	10 mos.	689	18,946,425	3,822,163	24,346,145	1,425,560	4,305,189	441,327	9,714,702	1,023,093	17,059,570	70.1	7,286,575	3,638,782	2,698,589	2,046,326
Central Vermont	Oct.	455	328,632	34,882	406,484	58,962	72,550	13,535	192,140	29,898	367,180	90.3	39,304	23,311	13,613	30,366
	10 mos.	455	3,384,356	395,316	4,188,808	730,637	854,860	131,634	1,946,119	227,595	3,891,252	92.9	297,556	137,505	48,814	278,947
Chesapeake & Ohio	Oct.	3,142	9,097,488	271,216	9,787,360	1,010,339	1,659,185	182,516	2,154,020	285,395	5,305,027	54.2	4,482,333	3,620,597	3,513,840	3,790,103
	10 mos.	3,134	86,207,252	2,432,256	92,184,309	9,624,718	16,751,905	1,670,577	20,329,482	2,820,286	51,312,743	55.7	40,871,566	32,203,981	30,976,548	30,863,796
Chicago & Eastern Illinois	Oct.	938	867,454	101,002	1,109,377	149,535	154,263	50,661	434,376	77,631	873,886	78.8	235,491	185,428	43,777	100,154
	10 mos.	938	8,338,065	1,023,430	10,617,222	1,335,038	1,638,657	499,174	4,230,977	616,481	8,373,311	78.9	2,243,911	1,629,384	381,278	96,458
Chicago & Illinois Midland	Oct.	131	293,113	1,023	302,395	33,163	70,826	15,106	67,383	19,187	205,665	68.0	96,730	85,966	87,279	89,432
	10 mos.	131	2,376,056	10,267	2,463,377	295,643	522,206	152,494	629,088	168,680	1,768,114	71.8	695,263	606,724	653,150	786,445
Chicago & North Western	Oct.	8,442	5,853,856	762,436	7,364,251	1,099,654	1,218,019	142,194	2,670,382	409,413	5,567,371	75.6	1,796,880	1,345,438	1,043,119	1,310,016
	10 mos.	8,442	50,392,623	7,377,047	64,842,012	9,435,191	13,358,156	1,643,221	24,860,258	3,080,919	52,667,029	81.2	12,174,983	6,883,901	4,618,364	5,553,541
Chicago, Burlington & Quincy	Oct.	9,061	6,710,471	621,545	8,087,196	1,010,008	1,035,708	203,765	2,641,551	430,965	5,375,178	66.5	2,712,018	2,324,491	1,930,224	2,082,220
	10 mos.	9,165	54,612,191	5,644,250	67,369,584	8,581,143	10,434,509	2,135,994	23,756,905	3,257,774	48,653,865	72.2	18,715,719	13,565,449	10,426,462	10,759,120
Chicago Great Western	Oct.	1,518	1,352,052	41,548	1,528,724	219,935	216,587	50,494	546,080	75,520	1,108,343	72.5	420,381	381,598	157,588	168,009
	10 mos.	1,518	11,638,606	435,151	13,053,075	1,708,121	1,923,559	510,862	4,909,998	549,393	9,593,046	73.5	3,460,029	2,937,993	1,015,728	861,259
Chicago, Indianapolis & Louisville	Oct.	644	541,233	54,596	673,247	70,274	152,993	25,631	266,746	40,819	562,208	83.5	111,039	108,509	13,429	33,163
	10 mos.	644	4,997,429	483,864	6,230,627	584,282	1,435,136	250,171	2,583,359	280,498	5,189,417	83.3	1,041,210	616,996	—330,825	—66,350

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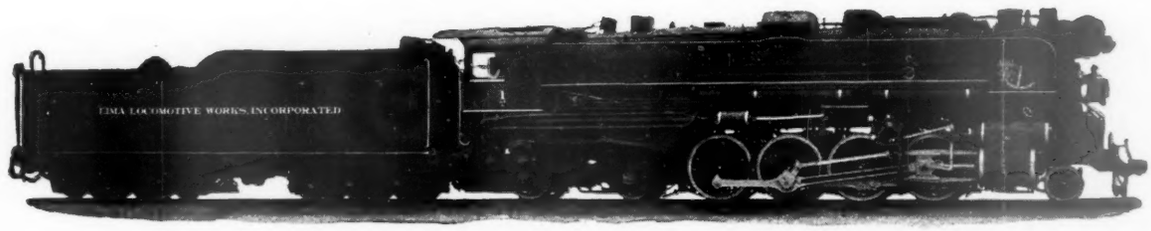
THE LIMA "A-1"

WAS THE DADDY OF THEM ALL



In the November 17th issue of the Railway Age there appeared a table showing that 298 locomotives of the 2-8-4 type had been built since 1925.

To this list should be added the LIMA "A-1" which was later sold to the Illinois Central Railroad.

"A-1" was the first of this type of locomotive ever built and it was designed and built by the Lima Locomotive Works, Incorporated at their own expense.

Since the "A-1" was brought out, the same principles of Super-Power design have been embodied in a great many types other than the 2-8-4, thus enabling the Railroads to move more traffic at greater speeds but with a reduction in fuel and maintenance expense, thereby increasing their revenue.

Super-Power Locomotives will increase your revenue.

LIMA
LOCOMOTIVE WORKS
INCORPORATED
LIMA OHIO

Revenues and Expenses of Railways

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1934—CONTINUED

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures	Maintenance of Equipment	Traffic	Transportation	General	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income	Net ry. operating income, 1933
Chicago, Mil., St. Paul & Pacific	Oct.	11,176	$7,205,858	$554,816	$8,534,475	$1,616,260	$1,345,999	$219,551	$2,974,183	$432,462	$6,617,886	77.5	$1,916,589	$1,444,730	$982,415	$1,233,003
	10 mos.	11,172	62,218,062	4,652,281	74,200,664	11,060,459	14,365,116	2,061,347	27,696,963	3,020,692	58,470,773	78.8	15,729,891	10,229,321	5,833,857	7,673,118
Chicago, Rock Island & Pacific	Oct.	7,582	4,786,377	515,824	5,845,270	674,375	1,218,135	187,714	2,312,572	388,598	4,853,428	83.0	991,842	781,078	485,008	479,846
	10 mos.	7,600	43,932,387	4,707,640	53,914,912	5,752,014	12,504,891	1,803,589	21,678,601	3,077,628	45,434,750	84.3	8,480,162	4,644,922	1,832,802	3,229,913
Chicago, Rock Island & Gulf	Oct.	721	309,549	22,301	335,293	63,769	31,090	16,107	117,112	26,017	256,118	76.4	79,175	68,147	15,456	6,625
	10 mos.	721	2,816,432	197,924	3,060,303	443,475	368,513	157,795	1,121,190	205,899	2,321,035	75.8	739,268	539,114	—16,288	—308,047
Chi., St. Paul, Minn. & Omaha	Oct.	1,654	1,192,913	109,087	1,402,219	182,000	198,844	30,649	628,810	97,441	1,145,982	81.7	256,237	180,810	87,137	194,369
	10 mos.	1,661	10,434,059	1,126,241	12,512,797	1,410,364	1,955,910	319,269	5,721,612	750,472	10,244,259	81.9	2,268,538	1,516,595	780,172	1,393,086
Clinchfield R. R.	Oct.	309	435,858	3,145	444,452	39,038	115,511	15,767	85,691	13,364	269,371	60.6	175,081	145,081	179,275	195,978
	10 mos.	309	4,293,944	33,336	4,378,499	391,706	1,012,300	155,848	822,611	134,440	2,516,905	57.5	1,861,594	1,456,510	1,735,884	1,550,270
Colorado & Southern	Oct.	1,023	513,498	20,526	586,568	43,971	112,244	11,344	205,841	41,709	415,027	70.8	171,541	114,898	88,030	155,577
	10 mos.	1,027	3,909,508	262,879	4,630,842	652,995	942,845	115,696	1,748,230	343,875	3,811,022	82.3	819,820	258,651	72,903	56,346
Ft. Worth & Denver City	Oct.	804	370,028	34,856	477,976	34,738	67,365	19,451	167,419	39,867	332,198	69.5	145,778	124,903	89,626	264,963
	10 mos.	804	3,864,222	351,283	4,806,997	360,611	673,026	163,587	1,477,205	340,189	3,035,041	63.1	1,771,956	1,480,185	1,155,760	1,149,485
Columbus & Greenville	Oct.	167	76,820	7,114	91,512	22,985	12,995	3,835	34,994	8,777	83,586	91.3	7,926	2,300	4,156	33,847
	10 mos.	167	594,856	57,462	707,985	150,349	112,550	36,546	304,913	88,042	692,390	97.8	15,595	—18,638	—3,107	83,837
Delaware & Hudson	Oct.	848	1,770,964	82,979	1,946,486	301,958	561,818	49,321	723,014	179,579	1,822,521	93.6	123,965	56,330	75,760	277,765
	10 mos.	848	17,511,565	979,199	19,526,807	2,854,587	5,320,827	484,526	7,524,363	1,467,974	17,715,166	90.7	1,811,641	1,108,566	1,230,888	672,084
Delaware, Lackawanna & Western	Oct.	992	2,785,811	534,615	3,784,230	274,689	695,923	105,380	1,664,949	157,900	2,913,937	77.0	870,293	508,630	457,644	233,183
	10 mos.	992	27,523,454	5,460,267	37,566,006	3,292,693	7,298,077	1,076,475	16,389,901	1,538,058	29,804,395	79.3	7,761,611	4,241,666	3,988,742	2,847,750
Denver & Rio Grande Western	Oct.	2,636	2,114,133	119,320	2,327,879	311,024	403,924	47,126	735,009	116,925	1,616,108	69.4	711,771	535,990	467,267	682,939
	10 mos.	2,544	14,207,486	837,054	15,951,583	1,914,304	3,616,358	455,588	5,217,587	883,266	12,139,801	76.1	3,811,782	2,283,429	1,976,599	2,478,860
Denver & Salt Lake	Oct.	232	256,567	2,672	269,493	18,744	28,384	1,527	43,589	14,541	106,486	39.5	163,007	150,007	186,615	104,780
	10 mos.	232	1,143,246	35,076	1,279,989	130,631	213,444	15,592	264,546	119,871	737,708	57.6	542,281	407,243	602,184	582,554
Detroit & Mackinac	Oct.	242	65,168	1,508	73,412	12,581	8,299	848	23,929	4,414	50,091	68.2	23,321	20,915	19,249	22,994
	10 mos.	242	448,468	26,987	535,573	101,039	78,509	8,512	211,660	37,340	437,038	81.6	98,535	121,529	107,703	37,948
Detroit & Toledo Shore Line	Oct.	50	216,902	.....	218,374	16,879	23,600	6,812	57,513	9,086	113,865	52.1	104,509	82,856	43,181	39,970
	10 mos.	50	2,424,437	.....	2,440,009	192,909	221,734	68,283	616,438	73,010	1,172,251	48.0	1,267,758	1,054,662	610,443	438,853
Detroit, Toledo & Ironton	Oct.	472	350,240	239	363,016	40,637	52,988	10,006	102,301	23,231	225,852	62.2	137,164	95,094	78,845	98,216
	10 mos.	472	4,791,280	2,669	4,948,520	452,726	671,868	98,279	1,135,294	190,587	2,512,893	50.8	2,435,627	1,915,711	1,693,910	896,826
Duluth, Missabe & Northern	Oct.	560	911,709	1,533	1,054,072	106,149	192,366	2,874	221,893	52,569	575,851	54.6	478,221	401,367	404,490	761,365
	10 mos.	562	8,015,825	31,085	9,295,290	1,271,202	2,133,413	31,892	1,959,598	428,682	5,824,256	62.7	3,471,034	2,730,587	2,740,931	4,291,718
Duluth, Winnipeg & Pacific	Oct.	178	82,880	2,065	88,314	25,120	17,131	1,856	40,133	6,081	90,302	102.3	—1,988	—6,773	—14,806	12,219
	10 mos.	178	684,535	25,359	738,261	200,938	179,085	18,995	347,863	53,769	800,394	108.4	—62,133	—100,909	—63,363	52,537
Elgin, Joliet & Eastern	Oct.	446	694,960	1	775,925	78,944	192,369	12,586	310,791	60,183	654,810	84.4	121,115	39,680	18,258	49,183
	10 mos.	446	7,817,619	39	8,706,265	920,160	2,147,892	124,429	3,343,580	489,112	7,024,783	80.7	1,681,482	864,104	489,152	750,413
Erie Railroad	Oct.	2,304	5,786,379	435,027	6,725,768	607,022	1,271,312	167,120	2,396,446	282,952	4,722,562	70.2	2,003,206	1,669,669	1,290,761	1,210,885
	10 mos.	2,311	54,541,237	4,422,017	63,902,288	6,041,092	12,818,515	1,608,220	22,587,732	2,798,701	45,902,362	71.8	17,999,926	14,652,985	11,268,535	10,628,000
New Jersey & New York	Oct.	45	15,105	50,605	67,557	5,238	25,034	1,393	50,198	3,119	84,982	125.8	—17,425	—21,575	—38,560	—37,097
	10 mos.	45	156,823	522,104	698,270	73,900	241,979	12,456	490,300	34,810	853,445	122.2	—155,175	—196,714	—358,138	—278,545
N. Y., Susquehanna & Western	Oct.	215	263,025	24,688	303,957	36,122	58,454	4,514	120,000	12,274	231,361	76.1	72,596	49,108	24,091	9,162
	10 mos.	215	2,645,920	260,139	3,061,149	347,555	581,301	43,698	1,202,856	120,260	2,295,661	75.0	765,488	527,978	339,910	208,503
Florida East Coast	Oct.	812	277,074	69,168	393,820	111,828	134,306	19,305	178,581	47,454	495,234	125.8	—101,414	—176,057	—201,185	—220,388
	10 mos.	823	4,055,127	1,467,683	6,309,492	1,112,051	1,299,002	199,599	1,981,409	405,871	5,063,858	80.3	1,245,634	529,403	122,077	—136,495
Fort Smith & Western	Oct.	249	62,827	929	67,074	14,934	10,516	6,618	19,834	4,033	55,271	82.4	11,803	9,781	3,796	20,008
	10 mos.	249	519,719	10,344	566,412	143,000	98,208	54,426	187,759	40,176	518,269	91.5	48,143	30,889	—21,499	—11,491
Georgia R. R.	Oct.	329	250,756	11,851	287,851	22,234	46,946	16,304	113,625	11,448	211,030	73.3	76,821	71,543	80,222	39,787
	10 mos.	329	2,290,861	140,549	2,659,511	268,616	547,182	163,161	1,115,969	129,350	2,228,435	83.8	431,076	378,193	438,574	469,285
Georgia & Florida	Oct.	437	67,185	2,717	74,388	15,818	14,468	7,116	31,953	7,181	76,404	102.7	—2,016	—8,020	—6,141	—8,741
	10 mos.	462	805,015	24,504	878,779	205,345	174,443	74,889	340,551	60,596	856,231	97.4	22,548	—31,929	—45,685	—3,679
Grand Trunk Western	Oct.	1,006	1,118,370	79,142	1,289,836	205,340	266,201	32,216	547,997	120,061	1,166,341	90.4	123,495	47,382	6,642	—109,365
	10 mos.	1,007	12,983,577	675,916	14,744,871	2,137,985	3,022,896	329,895	6,132,879	907,845	12,553,115	85.1	2,191,756	1,441,654	498,636	—690,570
Canadian Nat'l Lines in New Eng.	Oct.	172	66,120	5,078	80,106	25,367	16,421	2,666	59,171	11,679	115,556	144.2	—35,450	—48,062	—84,028	—76,655
	10 mos.	172	750,046	67,742	899,985	251,853	197,585	27,577	528,573	97,348	1,107,274	123.0	—207,289	—320,861	—684,078	—646,570
Great Northern	Oct.	8,328	7,226,714	350,529	8,083,450	597,148	1,026,351	151,443	2,315,662	308,880	4,455,019	55.1	3,628,431	3,075,494	2,790,768	2,259,632
	10 mos.	8,347	51,180,439	3,520,834	59,832,148	7,469,048	10,083,004	1,633,809	19,048,907	2,289,551	41,101,428	68.7	18,730,720	13,210,828	11,663,664	10,148,010
Green Bay & Western	Oct.	233	109,679	1,112	115,172	26,233	13,486	5,257	43,615	5,693	94,242	81.8	20,930	16,848	14,910	12,357
	10 mos.	233	863,165	9,706	917,831	204,342	176,522	46,824	395,135	35,261	857,835	93.4	59,996	7,824	—7,743	65,541
Gulf & Ship Island	Oct.	259	86,553	7,541	105,912	13,212	15,034	2,713	57,077	4,145	92,159	87.0	13,753	—1,797	—10,934	—17,311
	10 mos.	260	768,231	74,223	968,431	149,033	154,356	25,173	467,883	46,473	844,277	87.2	124,154	—32,537	—129,430	—139,672

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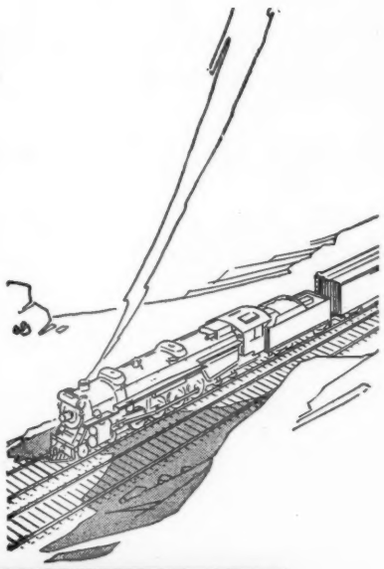
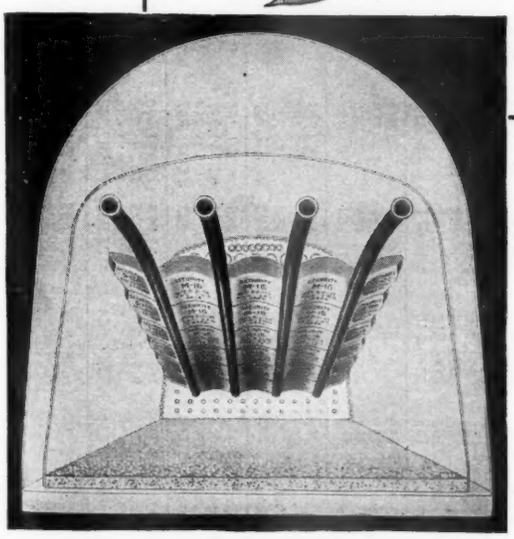
Experience

PLUS A CORRECT START





There's More to SECURITY ARCHES Than Just Brick

Over a quarter of a Century ago the American Arch Company introduced the Security Sectional Arch — small brick supported on arch tubes — the first and only practical brick arch for locomotive service. Basically correct to begin with there now is added 25 years intensive experience in brick arch design, brick arch application and arch brick manufacture. Security Sectional Arches are a sure guarantee of maximum arch economy and maximum fuel economy.

HARBISON-WALKER REFRACTORIES CO.

Refractory Specialists

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Revenues and Expenses of Railways

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1934—CONTINUED

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures	Maintenance of Equipment	Traffic	Transportation	General	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income	Net ry. operating income, 1933
Gulf, Mobile & Northern	Oct.	961	$421,210	$20,756	$460,681	$58,630	$71,727	$29,942	$135,479	$30,776	$326,515	70.88	$134,166	$103,073	$58,644	$64,879
	10 mos.	961	3,971,484	186,932	4,354,632	565,735	650,165	335,351	1,346,910	259,332	3,149,464	72.32	1,205,168	894,852	405,026	677,867
Illinois Central	Oct.	4,973	5,754,238	826,796	7,088,908	643,389	1,468,474	186,122	2,617,525	325,182	5,273,358	74.4	1,815,550	1,338,149	1,113,971	1,602,251
	10 mos.	5,003	53,255,674	7,131,823	66,022,733	5,702,830	13,538,576	1,797,576	24,630,388	3,227,248	49,215,334	74.5	16,807,399	12,410,266	10,303,840	12,287,208
Yazoo & Mississippi Valley	Oct.	1,636	997,443	87,446	1,159,606	119,838	188,478	28,300	454,538	63,629	855,167	73.7	304,439	173,549	69,442	303,263
	10 mos.	1,640	8,427,973	631,223	9,771,775	839,336	1,565,690	259,747	4,057,293	516,297	7,242,443	74.1	2,529,332	1,429,741	422,646	939,902
Illinois Central System	Oct.	6,609	6,751,681	914,242	8,248,514	763,227	1,656,952	214,422	3,072,063	388,811	6,128,525	74.3	2,119,989	1,509,787	1,193,858	1,915,971
	10 mos.	6,644	61,683,647	7,763,046	75,794,508	6,542,166	15,104,266	2,057,323	28,687,681	3,743,545	56,457,777	74.5	19,336,731	13,820,625	10,827,862	13,323,330
Illinois Terminal	Oct.	525	322,027	57,882	421,209	51,055	60,786	15,173	144,100	23,906	296,388	70.37	124,821	99,532	82,644	75,470
	10 mos.	525	3,202,160	562,941	4,080,370	491,130	596,737	145,516	1,445,848	180,448	2,866,744	70.26	1,213,626	954,878	783,361	734,287
Kansas City Southern	Oct.	882	710,361	23,429	836,637	76,480	142,112	50,151	267,950	83,494	619,846	74.1	216,791	156,180	111,734	112,854
	10 mos.	882	7,029,985	175,979	8,167,538	757,286	1,348,530	475,661	2,605,118	729,451	5,925,613	72.6	2,241,925	1,622,165	1,200,571	1,029,390
Kansas, Oklahoma & Gulf	Oct.	326	156,268	425	159,608	27,497	18,601	7,189	37,111	10,576	100,513	63.0	59,095	47,090	30,939	55,654
	10 mos.	326	1,551,690	3,784	1,584,290	190,449	144,089	72,349	367,777	88,927	835,330	52.7	748,960	607,573	440,206	418,248
Lake Superior & Ishpeming	Oct.	160	140,604	113	163,275	28,042	22,607	678	30,006	7,632	88,965	54.5	74,310	53,343	51,902	190,195
	10 mos.	160	1,169,126	1,400	1,351,070	256,659	199,187	6,433	269,632	64,077	795,909	58.9	555,161	368,630	350,384	759,162
Lehigh & Hudson River	Oct.	96	117,732	123	119,537	17,132	19,098	2,993	40,748	8,024	87,995	73.6	31,542	20,510	8,676	12,408
	10 mos.	96	1,180,599	1,857	1,212,908	151,889	204,723	31,708	407,857	70,676	866,853	71.5	346,055	240,917	119,135	162,713
Lehigh & New England	Oct.	228	298,055	377	301,085	38,266	63,459	5,135	110,919	20,311	238,090	79.1	62,995	52,741	55,966	53,293
	10 mos.	227	2,917,800	4,557	2,946,011	364,414	640,581	51,344	994,084	162,313	2,212,616	75.1	733,395	617,945	658,063	570,672
Lehigh Valley	Oct.	1,353	3,072,663	180,457	3,518,253	173,875	598,891	111,471	1,475,838	137,046	2,513,415	71.4	1,004,838	853,264	756,648	593,742
	10 mos.	1,353	28,949,634	2,040,665	33,449,219	2,620,269	6,055,325	1,099,544	14,715,244	1,344,684	26,007,427	77.8	7,441,792	5,585,005	4,195,119	3,532,586
Louisiana & Arkansas	Oct.	608	366,005	9,281	401,306	52,648	63,779	24,551	100,288	23,397	264,034	65.8	137,272	103,732	92,003	67,610
	10 mos.	608	3,362,505	86,416	3,716,025	466,751	616,741	242,231	903,290	199,963	2,430,639	65.4	1,285,386	959,688	860,694	786,792
Louisiana, Arkansas & Texas	Oct.	255	90,109	281	96,239	19,708	9,119	4,804	30,401	6,756	70,788	73.6	25,451	21,242	6,336	1,355
	10 mos.	255	761,779	3,464	816,486	178,930	93,735	45,179	272,740	48,470	631,505	77.3	184,981	158,180	13,756	—13,204
Louisville & Nashville	Oct.	5,051	5,148,526	431,620	6,087,481	765,457	1,213,593	158,855	2,147,524	269,648	4,589,749	75.4	1,497,732	1,155,086	1,212,573	1,061,151
	10 mos.	5,064	49,345,331	4,366,515	58,248,949	7,011,980	12,187,171	1,634,848	20,516,456	2,843,333	44,519,544	76.4	13,729,405	10,342,660	10,472,950	9,943,847
Maine Central	Oct.	1,046	830,355	55,669	982,006	139,861	109,920	11,711	334,443	36,517	632,349	64.4	349,656	300,838	261,961	212,772
	10 mos.	1,049	7,424,217	790,988	9,094,719	1,472,514	1,488,898	103,853	3,375,461	367,536	6,808,080	74.9	2,286,639	1,806,288	1,396,221	1,686,488
Midland Valley	Oct.	363	127,135	65	129,873	22,862	8,449	2,174	29,829	7,673	70,975	54.6	58,898	51,420	39,633	62,811
	10 mos.	363	1,046,124	3,829	1,089,455	161,818	106,018	22,494	284,183	65,727	635,888	58.4	453,567	388,209	314,509	370,365
Minneapolis & St. Louis	Oct.	1,650	768,925	16,350	828,008	122,758	137,013	24,918	335,632	2,159	621,593	75.1	206,415	188,329	141,333	91,656
	10 mos.	1,629	5,840,058	144,646	6,378,706	938,137	1,299,070	219,708	2,971,085	336,132	5,754,739	90.2	623,967	310,797	59,463	249,046
Minn., St. Paul & S. S. Marie	Oct.	4,303	1,903,608	82,889	2,148,000	274,336	313,692	52,229	806,098	124,456	1,575,649	73.4	572,351	509,665	364,599	258,820
	10 mos.	4,304	16,482,081	947,607	19,003,508	2,502,091	3,436,258	576,057	7,581,566	1,151,159	15,305,266	80.5	3,698,242	2,372,470	1,082,538	951,686
Duluth, South Shore & Atlantic	Oct.	555	171,850	8,454	203,026	27,578	31,484	4,637	79,200	9,184	152,063	74.9	50,963	42,535	38,116	487
	10 mos.	557	1,625,668	96,308	1,910,090	290,279	365,853	44,882	747,479	67,985	1,512,659	79.2	397,431	291,541	193,376	32,988
Spokane International	Oct.	163	44,912	2,121	52,278	11,262	6,082	1,835	19,261	5,110	43,527	83.3	8,751	7,234	4,835	48
	10 mos.	163	370,336	15,671	435,750	110,872	56,059	17,313	188,887	43,965	417,029	95.7	18,721	—14,169	—38,154	—95,832
Mississippi Central	Oct.	150	52,254	2,399	56,683	7,554	10,200	7,211	18,188	6,443	49,583	87.5	7,100	4,196	1,697	889
	10 mos.	150	502,593	17,518	539,768	90,371	105,560	69,210	165,644	56,372	487,141	90.3	52,627	23,968	—2,855	—16,031
Missouri & North Arkansas	Oct.	364	64,497	1,465	72,211	14,038	9,027	3,321	24,638	5,634	56,658	78.5	15,553	16,152	8,149	15,487
	10 mos.	364	711,394	13,163	794,059	182,696	101,993	33,059	271,361	41,546	630,405	79.4	163,654	147,764	55,857	41,552
Missouri-Illinois	Oct.	202	88,821	1,124	92,225	18,039	11,958	2,592	29,182	7,023	68,780	74.6	23,445	17,580	11,095	8,387
	10 mos.	202	781,065	5,870	805,364	178,150	103,952	25,676	262,444	59,283	629,414	78.2	175,950	121,553	47,690	18,233
Missouri-Kansas-Texas Lines	Oct.	3,293	1,839,922	162,954	2,276,728	257,634	408,187	106,070	815,826	154,590	1,760,129	77.3	516,599	392,402	204,110	746,502
	10 mos.	3,293	18,401,975	1,567,595	22,337,235	2,691,142	3,950,394	1,106,811	7,820,059	1,391,261	17,121,842	76.7	5,215,393	3,529,071	1,688,995	1,881,167
Missouri Pacific	Oct.	7,357	5,856,346	335,285	6,771,365	899,022	1,458,430	206,234	2,396,832	378,783	5,367,370	79.3	1,403,995	1,052,225	544,098	801,946
	10 mos.	7,359	53,494,304	3,248,794	62,339,547	8,541,621	13,045,446	2,149,495	21,860,165	2,892,061	48,682,785	78.1	13,656,762	10,343,516	5,915,537	6,383,075
Gulf Coast Lines	Oct.	1,763	624,241	30,329	725,914	127,857	155,291	41,339	232,220	63,078	619,126	85.29	106,788	63,911	1,685	48,796
	10 mos.	1,764	7,343,759	332,227	8,273,847	1,246,276	1,469,933	417,837	2,496,738	499,352	6,119,243	73.96	2,154,604	1,676,455	830,293	147,384
International-Great Northern	Oct.	1,154	1,007,145	51,978	1,191,620	149,371	179,122	26,365	415,957	62,699	843,621	70.80	347,999	313,290	199,005	108,531
	10 mos.	1,158	9,133,370	529,775	10,704,537	1,341,878	1,717,247	276,100	3,873,698	484,975	7,787,968	72.75	2,916,569	2,561,665	1,344,602	1,438,675
San Antonio, Uvalde & Gulf	Oct.	316	70,476	2,734	81,684	15,512	8,997	3,927	17,583	5,690	50,526	61.9	31,158	27,895	7,528	—6,606
	10 mos.	316	806,064	27,983	905,562	170,663	92,626	40,979	263,693	46,479	613,097	67.7	292,465	254,864	49,094	—113,950
Mobile & Ohio	Oct.	1,201	666,737	27,662	731,455	108,943	157,514	39,503	281,873	51,358	639,028	87.4	92,427	63,921	5,964	8,181
	10 mos.	1,201	6,543,190	259,433	7,206,189	990,882	1,713,221	399,093	2,640,043	400,419	6,143,340	85.3	1,062,849	729,796	62,174	155,293
Monongahela	Oct.	177	315,274	596	318,166	30,487	30,771	419	65,757	7,085	134,519	42.3	183,647	167,149	83,332	81,227
	10 mos.	177	3,197,477	8,158	3,227,897	327,436	287,501	3,715	642,925	44,070	1,304,432	40.4	1,923,465	1,711,418	926,895	975,269

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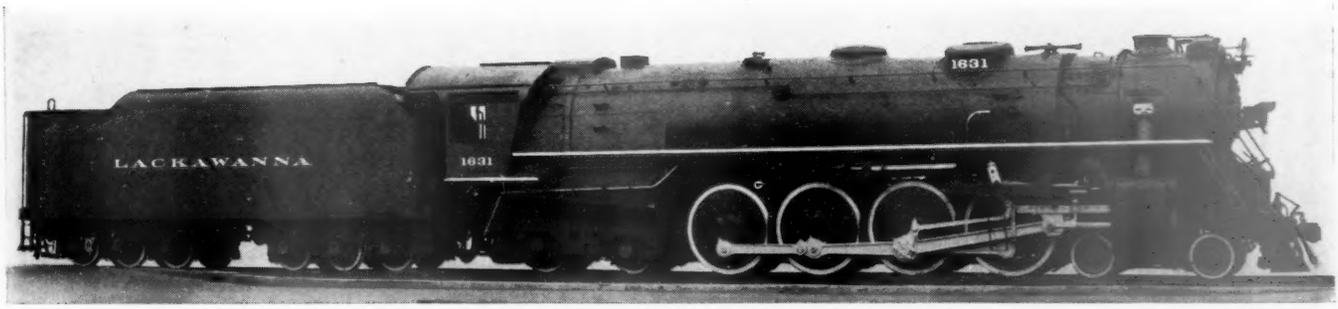
NEW POWER
ON THE LACKAWANNA



Weight on Drivers, 274,000 pounds; Weight of Engine, 447,000 pounds; Cylinder, 28 x 32 inches; Diameter of Drivers, 74 inches; Boiler Pressure, 250 pounds; Maximum Tractive Power, 72,000 pounds.

Built for high-speed heavy passenger and freight service.

Designed to sell transportation at a price, with due regard for speed, safety, and passenger comfort; all-around service and dependability irrespective of weather conditions; and against all manner of competition.

A truly economical, modern, railroad power unit.

AMERICAN LOCOMOTIVE COMPANY

30 CHURCH STREET · NEW YORK · N.Y.

Revenues and Expenses of Railways

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1934—CONTINUED

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures	Maintenance of Equipment	Traffic	Transportation	General	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income	Net ry. operating income, 1933
Montour	Oct.	57	$175,653	.....	$176,513	$13,108	$38,375	$900	$35,582	$6,268	$94,233	53.4	$82,280	$62,517	$80,733	$11,604
	10 mos.	57	1,586,923	$4	1,592,133	132,715	435,144	9,992	329,778	62,685	970,314	60.9	621,819	479,897	650,230	619,286
Nashville, Chattanooga & St. Louis	Oct.	1,203	887,559	82,499	1,086,330	149,898	262,388	53,504	437,735	62,133	972,318	89.5	114,012	76,693	65,079	35,223
	10 mos.	1,203	8,916,875	737,517	10,754,016	1,441,089	2,462,756	547,862	4,170,910	560,024	9,233,067	85.9	1,520,949	1,146,294	890,065	914,734
Nevada Northern	Oct.	165	37,366	955	42,871	8,304	4,423	661	8,347	4,133	25,868	60.3	17,003	8,887	12,609	3,634
	10 mos.	165	250,292	9,104	299,710	85,302	32,039	7,096	70,961	35,207	230,605	76.9	69,105	447	37,754	—29,874
New York Central	Oct.	11,401	17,503,616	4,538,144	25,202,899	2,945,116	5,326,316	519,380	9,194,900	997,934	19,330,473	76.7	5,872,426	3,652,042	2,422,957	3,436,812
	10 mos.	11,401	172,077,891	45,550,506	247,802,495	25,559,878	50,710,417	5,238,488	91,498,487	10,134,762	186,457,179	75.2	61,345,316	39,653,005	25,878,891	29,222,608
Pittsburgh & Lake Erie	Oct.	233	1,143,212	39,386	1,219,844	149,585	471,006	24,258	409,378	62,294	1,124,187	92.2	95,657	36,202	178,434	218,351
	10 mos.	233	12,126,037	465,127	13,007,025	1,176,894	4,333,888	245,367	4,362,284	644,248	10,827,048	83.2	2,179,977	1,343,635	2,785,832	2,558,427
New York, Chicago & St. Louis	Oct.	1,691	2,646,404	78,611	2,819,933	338,029	409,774	100,679	993,799	121,815	1,968,383	69.8	851,550	696,082	431,681	418,989
	10 mos.	1,691	26,256,553	784,473	28,017,162	3,000,426	4,093,393	1,001,973	9,679,142	1,215,507	18,960,593	67.7	9,056,569	7,553,938	4,793,986	4,435,690
N. Y., New Haven & Hartford	Oct.	2,072	3,375,477	1,746,636	5,832,800	674,545	1,056,556	74,775	2,233,975	337,559	4,499,685	77.1	1,333,115	932,871	407,607	694,381
	10 mos.	2,069	33,205,678	17,860,782	57,919,798	6,739,280	10,318,411	735,679	22,498,139	2,602,948	44,168,966	76.3	13,750,832	10,027,082	4,711,125	6,422,819
New York Connecting	Oct.	20	201,320	.....	213,827	24,560	7,114	.....	25,583	1,138	58,395	27.3	155,432	122,132	79,695	86,609
	10 mos.	20	2,113,905	.....	2,232,540	121,271	73,400	.....	282,752	10,302	487,725	21.8	1,744,815	1,410,985	1,009,329	1,116,978
New York, Ontario & Western	Oct.	568	614,597	4,573	676,531	103,376	133,279	11,430	297,325	26,885	572,194	84.6	104,337	69,360	15,795	46,366
	10 mos.	568	6,948,391	385,717	8,053,764	955,840	1,441,709	115,466	3,275,799	278,053	6,097,438	75.7	1,956,326	1,522,655	1,021,687	1,447,755
Norfolk & Western	Oct.	2,184	6,107,768	156,048	6,467,882	665,997	1,491,095	113,093	1,456,159	291,174	4,029,163	62.3	2,438,719	1,868,356	2,085,256	2,896,600
	10 mos.	2,185	57,584,876	1,481,253	60,973,712	6,371,302	13,729,014	1,128,361	13,810,133	2,214,968	37,378,655	61.3	23,595,057	16,761,009	18,459,337	20,543,646
Norfolk Southern	Oct.	932	377,416	8,593	405,349	73,262	51,647	20,446	149,039	29,385	323,779	79.9	81,570	45,384	19,919	116,492
	10 mos.	932	3,806,286	103,558	4,088,420	682,254	496,615	193,595	1,423,574	247,355	3,043,393	74.4	1,045,027	771,571	479,596	176,904
Northern Pacific	Oct.	6,745	4,434,915	258,740	5,119,168	528,105	1,043,936	138,501	1,813,021	363,056	3,945,231	77.1	1,173,937	673,526	958,339	1,330,376
	10 mos.	6,745	36,454,164	2,819,798	43,315,757	4,769,530	9,105,209	1,472,376	16,143,155	2,850,651	34,940,961	80.7	8,374,796	3,484,567	6,322,858	4,338,367
Northwestern Pacific	Oct.	386	197,515	77,847	312,013	41,669	51,454	4,161	150,277	20,237	267,551	85.7	44,462	29,190	16,104	7,175
	10 mos.	386	1,657,119	811,569	2,794,836	392,925	471,860	42,473	1,402,478	157,649	2,465,549	88.2	329,287	166,719	53,996	—181,677
Oklahoma City-Ada-Atoka	Oct.	132	31,444	373	33,634	5,207	1,714	647	10,884	1,944	20,443	60.8	13,191	10,515	3,198	—1,304
	10 mos.	132	262,834	3,424	283,912	50,201	16,604	6,619	101,926	16,859	191,592	67.5	92,320	63,416	—5,218	—11,825
Pennsylvania Railroad	Oct.	10,511	21,680,215	4,966,455	29,732,441	2,325,000	4,851,868	555,165	10,060,042	1,979,106	20,089,590	67.6	9,642,851	6,866,796	6,139,707	5,820,719
	10 mos.	10,511	212,735,601	48,546,330	290,220,748	26,109,678	56,021,503	5,662,151	102,761,383	15,257,181	209,082,662	72.0	81,138,086	59,623,196	51,268,204	53,231,434
Long Island	Oct.	400	567,626	1,318,565	1,983,898	140,915	308,256	18,117	846,909	85,128	1,399,317	70.5	584,581	353,394	174,969	271,989
	10 mos.	400	4,792,347	14,694,773	20,478,299	1,745,174	3,137,127	149,544	8,917,647	645,017	14,597,295	71.3	5,881,004	3,573,956	1,826,990	3,342,204
Pennsylvania-Reading Seashore Lines	Oct.	411	240,877	120,587	384,464	43,615	65,293	7,798	267,630	35,415	419,003	109.0	—34,539	—106,860	—185,530	—217,975
	10 mos.	411	2,317,490	2,413,183	4,995,464	428,887	760,066	94,483	3,131,156	291,954	4,701,384	94.1	294,080	—562,655	—1,612,907	—995,068
Pere Marquette	Oct.	2,222	1,728,638	50,460	1,884,284	282,459	427,232	59,708	731,551	90,426	1,595,195	84.7	289,089	183,015	44,486	168,569
	10 mos.	2,235	18,966,064	638,541	20,776,880	2,431,751	4,485,233	584,718	7,836,965	885,247	16,260,564	78.3	4,516,316	3,526,671	2,437,668	1,379,790
Pittsburg & Shawmut	Oct.	101	56,986	435	58,256	10,165	16,424	1,335	17,561	5,024	50,509	86.7	7,747	6,638	9,824	9,497
	10 mos.	101	523,882	4,361	535,304	95,552	173,266	13,447	166,489	33,959	482,713	90.2	52,591	45,497	93,860	98,580
Pittsburgh & West Virginia	Oct.	138	194,336	.....	204,808	24,653	62,308	13,660	47,721	17,855	173,709	84.8	31,099	16,268	62,654	58,083
	10 mos.	138	2,208,993	.....	2,311,686	219,924	611,904	140,479	479,657	145,702	1,676,996	72.5	634,690	417,466	729,311	797,918
Pittsburg, Shawmut & Northern	Oct.	195	68,741	140	70,441	16,946	16,662	1,227	28,704	8,028	71,567	101.6	—1,126	—3,313	—9,070	23,065
	10 mos.	195	722,211	1,683	749,644	188,025	191,005	13,002	281,474	67,738	741,244	98.9	8,400	—13,935	—67,573	88,387
Reading	Oct.	1,461	3,807,371	231,352	4,265,623	346,339	638,336	69,621	1,604,608	288,642	2,963,502	69.5	1,302,121	1,028,691	1,067,253	1,498,906
	10 mos.	1,461	39,913,210	2,452,291	44,534,783	3,296,610	8,060,712	713,084	16,456,494	2,099,667	30,797,704	69.2	13,737,079	10,621,394	10,802,779	11,404,427
Richmond, Fredericksburg & Potomac	Oct.	117	207,584	109,501	412,384	66,857	111,311	8,663	196,309	41,566	430,473	104.4	—18,089	—29,706	—37,923	8,665
	10 mos.	117	2,723,329	1,277,373	5,097,774	522,516	1,139,390	82,440	2,038,605	324,041	4,197,557	82.3	900,217	645,231	313,865	383,176
Rutland	Oct.	413	186,907	30,244	276,242	52,620	55,860	12,440	133,465	14,193	268,566	97.2	7,676	—12,872	—8,591	33,714
	10 mos.	413	1,842,854	335,155	2,758,908	486,486	560,561	105,114	1,303,219	135,958	2,590,725	93.9	168,183	—32,528	—1,349	260,172
St. Louis-San Francisco	Oct.	5,092	3,031,112	219,648	3,579,574	650,081	818,610	92,915	1,272,541	220,036	3,060,749	85.5	518,825	257,027	233,792	508,786
	10 mos.	5,155	29,077,078	2,032,094	34,074,512	5,623,116	7,870,806	949,928	11,978,620	1,665,490	28,094,635	82.5	5,979,877	3,354,490	3,065,233	3,172,633
Fort Worth & Rio Grande	Oct.	233	41,259	938	49,556	8,391	13,551	2,693	25,557	5,831	56,005	113.0	—6,449	—10,167	—16,954	—23,719
	10 mos.	233	305,395	11,962	385,144	125,880	102,947	23,350	218,903	41,331	512,344	133.0	—127,200	—164,759	—221,187	—342,000
St. Louis, San Francisco & Texas	Oct.	261	75,168	346	79,220	32,977	18,032	4,427	37,202	9,399	102,028	128.8	—22,808	—26,859	—48,420	—17,462
	10 mos.	261	774,887	5,806	813,113	301,517	157,591	45,312	349,411	81,790	934,361	114.9	—121,248	—162,151	—413,483	—300,560
St. Louis Southwestern Lines	Oct.	1,810	1,211,184	20,106	1,292,809	125,583	172,915	68,166	403,945	90,198	867,297	67.1	425,512	350,536	265,359	282,833
	10 mos.	1,833	11,341,289	173,743	12,075,552	1,254,251	1,699,775	676,879	3,919,803	683,962	8,294,776	68.7	3,780,776	3,069,002	1,810,671	1,499,752
San Diego & Arizona Eastern	Oct.	155	24,541	3,145	29,811	9,771	8,757	1,501	19,834	5,603	46,010	154.3	—16,199	—18,454	—16,573	—7,008
	10 mos.	155	328,798	44,215	384,922	98,371	87,520	16,070	159,983	44,761	412,344	107.1	—27,422	—47,367	—33,763	—38,323
Seaboard Air Line	Oct.	4,308	2,036,205	278,767	2,610,194	508,896	574,388	133,290	1,010,894	194,196	2,455,267	94.1	154,927	18,158	—40,668	187,792
	10 mos.	4,309	22,430,426	2,745,602	28,139,537	4,740,266	5,913,571	1,313,806	10,165,679	1,469,463	23,911,559	85.0	4,227,978	2,251,990	1,274,584	2,002,840

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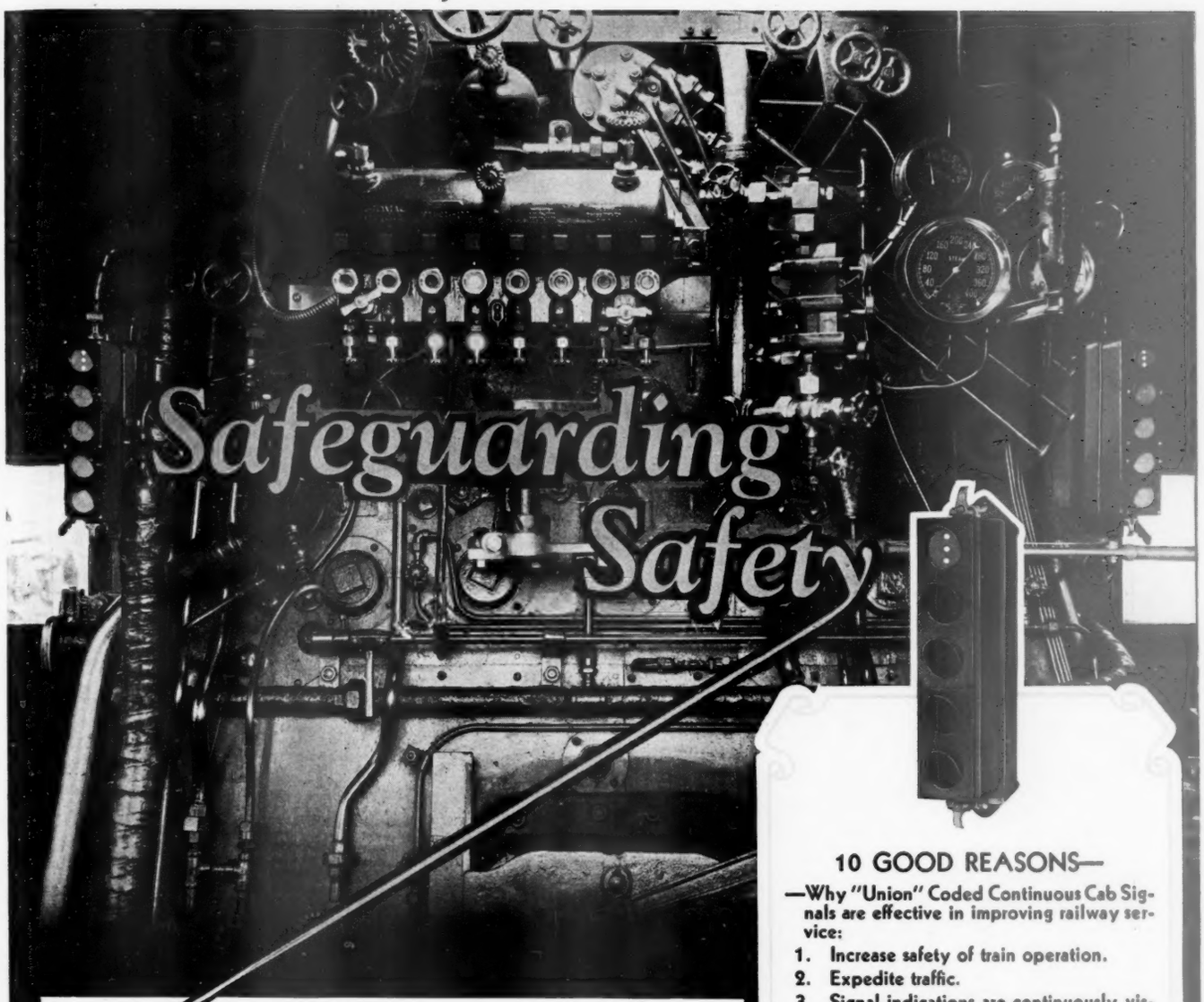

Safeguarding Safety

That there may be no slip-up in the safety of operation on the part of trainmen when a change in signal indications takes place, the "Union" Coded Continuous Cab Signal may be duplicated on the fireman's side of the cab.

This optional supplemental safety feature is but one of the outstanding advantages of the "Union" Coded Continuous Cab Signal. Shall we tell you about the others? . . . . . .

10 GOOD REASONS—

—Why "Union" Coded Continuous Cab Signals are effective in improving railway service:

1. **Increase safety of train operation.**
2. **Expedite traffic.**
3. **Signal indications are continuously visible irrespective of fog, other weather conditions, curves or physical obstructions.**
4. **Indicate *instantly* any changed condition on track ahead.**
5. **Permit trains to increase speed *at any point* where a less restrictive indication is received.**
6. **Determine location of broken rails.**
7. **Supplemented by audible indication.**
8. **Cab Signal Indicator Test Device.**
9. **Prevent misreading of wayside signals.**
10. **Effect operating economies.**

1881 **Union Switch & Signal Co.** 1934

SWISSVALE, PA.

NEW YORK MONTREAL CHICAGO ST. LOUIS SAN FRANCISCO

Revenues and Expenses of Railways

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1934—CONTINUED

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of: Way and structures	Equipment	Traffic	Transportation	General	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income	Net ry. operating income, 1933
Southern Ry.	Oct.	6,644	$5,543,234	$625,434	$6,860,713	$883,827	$1,279,836	$141,301	$2,480,431	$386,364	$5,211,706	76.0	$1,649,007	$1,199,685	$1,030,832	$1,430,503
	10 mos.	6,644	52,681,887	6,553,993	65,240,460	8,555,492	12,170,667	1,396,884	23,794,676	2,809,102	49,116,199	75.3	16,124,261	11,604,898	9,786,623	12,673,369
Alabama Great Southern	Oct.	315	350,913	45,913	437,019	80,899	95,779	10,958	138,819	21,931	351,091	80.3	85,928	58,650	57,982	46,868
	10 mos.	315	3,331,510	429,696	4,099,879	737,739	908,388	106,524	1,344,724	163,041	3,284,515	80.1	815,364	571,237	540,263	491,710
Cinn., New Orleans & Texas Pacific	Oct.	336	836,517	62,692	966,200	151,674	202,422	27,156	263,608	51,678	701,832	72.6	264,368	214,991	197,846	265,332
	10 mos.	336	9,151,759	657,639	10,414,772	1,328,088	1,874,443	239,910	2,681,535	401,794	6,569,693	63.1	3,845,079	3,158,333	2,754,446	2,995,874
Georgia Southern & Florida	Oct.	397	90,399	32,316	142,976	31,018	39,081	1,619	73,691	6,680	155,352	108.7	—12,376	—25,270	—17,431	—12,566
	10 mos.	397	1,113,365	266,881	1,562,242	291,175	369,142	16,480	700,116	35,158	1,434,024	91.8	128,218	—2,266	55,759	—1,460
New Orleans & Northeastern	Oct.	204	153,405	18,457	189,958	29,265	33,331	5,450	70,633	11,531	151,715	79.9	38,243	11,152	—3,728	11,185
	10 mos.	204	1,511,415	181,452	1,835,750	260,908	343,597	54,552	641,740	94,726	1,409,715	76.8	426,035	188,388	42,159	—201,536
Northern Alabama	Oct.	99	41,807	1,600	45,187	11,093	1,489	1,208	15,960	2,382	32,132	71.1	13,055	9,410	—783	6,954
	10 mos.	99	414,766	16,733	448,539	99,792	14,933	11,542	151,909	18,767	296,091	66.0	152,448	120,016	19,806	—13,702
Southern Pacific	Oct.	8,798	8,116,901	1,363,333	10,491,306	853,703	1,596,794	296,061	3,680,882	732,593	7,341,454	70.0	3,149,852	2,385,555	2,057,986	2,353,597
	10 mos.	8,839	73,039,159	13,140,929	95,392,459	9,288,546	16,141,306	2,718,874	33,139,086	5,886,644	68,915,186	72.2	26,477,273	18,337,436	14,796,612	7,175,758
So. Pac. Steamship Lines	Oct.	....	380,316	19,350	414,295	16,324	113,344	15,682	334,245	26,973	506,568	122.3	—92,273	—92,823	—91,317	—1,831
	10 mos.	....	3,475,194	162,504	3,757,680	155,247	1,094,260	161,388	2,791,075	218,102	4,420,072	117.6	—662,392	—668,735	—663,243	—328,728
Texas & New Orleans	Oct.	4,450	2,371,339	215,228	2,956,289	434,537	506,100	107,666	987,549	257,714	2,309,133	78.1	647,156	397,696	216,023	136,697
	10 mos.	4,465	21,146,072	2,071,452	26,440,532	4,131,252	5,925,015	1,104,240	9,141,756	2,180,652	22,596,800	85.5	3,843,732	1,489,302	—466,537	—281,025
Spokane, Portland & Seattle	Oct.	552	385,650	49,209	474,191	30,690	63,369	5,702	153,945	22,214	278,016	58.6	196,175	141,937	112,048	90,751
	10 mos.	552	4,162,788	399,563	4,916,913	427,582	615,550	59,310	1,482,294	164,008	2,768,889	56.3	2,148,024	1,579,551	1,297,705	681,297
Tennessee Central	Oct.	287	173,814	5,331	189,458	31,403	23,229	5,259	60,785	13,047	133,480	70.5	55,978	49,507	38,904	21,615
	10 mos.	287	1,602,028	53,387	1,755,471	281,151	254,763	51,720	588,159	112,571	1,286,864	73.3	468,607	426,188	287,778	237,657
Texas & Pacific	Oct.	1,949	1,716,279	171,338	2,140,592	240,092	340,277	64,288	620,938	138,828	1,421,179	66.4	719,413	605,122	512,492	415,848
	10 mos.	1,950	14,883,850	1,570,432	18,600,299	1,900,545	3,140,290	639,022	5,429,558	1,171,958	12,440,397	66.9	6,159,902	5,072,635	3,963,348	2,939,336
Texas Mexican	Oct.	162	87,498	255	96,702	11,895	12,960	3,686	29,595	6,762	64,383	66.6	32,319	28,062	24,502	—7,552
	10 mos.	162	707,714	3,410	783,876	106,340	119,044	29,868	275,019	70,600	599,484	76.5	184,392	141,148	98,616	—97,122
Toledo, Peoria & Western	Oct.	239	168,700	19	171,190	35,631	13,264	15,055	43,012	7,840	114,802	67.1	56,388	46,378	21,626	26,128
	10 mos.	239	1,451,047	146	1,472,828	372,231	123,855	147,774	410,804	85,513	1,140,177	77.4	332,651	280,280	130,388	194,014
Union Pacific	Oct.	3,767	6,079,831	437,995	7,076,602	491,266	1,248,952	105,479	2,078,494	367,963	4,373,962	61.8	2,702,640	2,180,767	1,651,891	2,287,267
	10 mos.	3,767	47,226,914	4,382,514	56,650,897	5,109,455	12,322,084	1,140,305	16,876,311	2,902,600	39,098,051	69.0	17,552,846	12,880,466	9,886,755	11,464,478
Oregon Short Line	Oct.	2,504	2,141,467	103,482	2,370,173	163,140	298,737	31,010	721,657	125,633	1,359,908	57.4	1,010,265	779,797	633,548	781,058
	10 mos.	2,504	15,526,826	1,015,122	17,855,062	2,061,027	2,804,720	310,399	5,581,839	970,484	12,026,082	67.4	5,828,980	3,553,108	2,689,025	2,564,910
Oregon-Wash. R. R. & Nav. Co.	Oct.	2,293	1,240,184	121,276	1,485,170	187,443	162,952	45,888	525,226	111,570	1,040,449	70.1	444,721	313,595	193,820	45,642
	10 mos.	2,294	10,543,601	1,045,599	12,938,012	2,263,040	1,759,901	470,111	4,591,302	903,970	10,054,018	77.7	2,883,994	1,523,828	495,571	—264,341
Los Angeles & Salt Lake	Oct.	1,232	1,235,736	150,465	1,504,702	114,044	176,572	41,062	437,139	68,607	871,448	57.9	633,254	528,350	409,023	369,230
	10 mos.	1,238	11,309,694	1,314,747	13,715,905	1,425,144	1,935,838	425,602	3,884,264	590,896	8,575,719	62.5	5,140,186	3,952,410	2,769,988	1,287,988
St. Joseph & Grand Island	Oct.	258	295,212	2,693	304,206	28,237	28,453	2,334	87,614	12,259	159,375	52.4	144,831	131,474	83,340	114,671
	10 mos.	258	2,348,884	19,714	2,436,087	306,527	259,886	21,877	718,844	120,495	1,434,311	58.9	1,001,776	857,258	524,214	502,348
Utah	Oct.	111	111,219	.....	111,657	16,513	24,997	473	22,306	5,081	69,370	62.1	42,287	27,721	21,466	8,757
	10 mos.	111	536,485	.....	538,257	103,673	172,053	5,273	129,963	49,715	460,677	85.6	77,580	—137	—98,049	45,083
Virginian	Oct.	619	1,204,272	3,158	1,254,459	84,694	192,230	16,841	217,026	38,656	548,764	43.7	705,695	570,422	625,023	522,281
	10 mos.	619	11,375,433	48,550	11,888,921	998,891	2,061,731	164,444	2,090,955	287,798	5,596,674	47.1	6,292,247	4,856,900	5,493,177	4,996,888
Wabash	Oct.	2,451	2,826,906	201,114	3,253,331	350,063	472,019	131,669	1,195,915	193,411	2,354,849	72.4	898,482	828,707	497,484	404,744
	10 mos.	2,456	28,295,536	1,737,679	32,123,588	3,986,615	5,082,010	1,323,639	12,056,236	1,420,782	23,939,688	74.5	8,183,900	6,929,993	3,524,822	1,937,440
Ann Arbor	Oct.	293	282,633	2,392	293,033	26,254	51,881	10,620	122,964	16,807	228,597	78.0	64,436	58,687	38,427	32,460
	10 mos.	293	2,648,933	30,111	2,779,605	248,203	497,101	108,037	1,177,486	120,938	2,153,471	77.5	626,134	502,987	315,001	189,539
Western Maryland	Oct.	883	1,186,722	7,734	1,225,876	179,104	254,335	34,191	319,993	45,857	835,306	68.1	390,570	355,570	374,825	418,143
	10 mos.	890	11,185,187	88,462	11,583,201	1,574,196	2,547,689	345,551	2,976,173	435,151	7,903,419	68.2	3,679,782	3,024,782	3,404,322	3,294,762
Western Pacific	Oct.	1,213	1,305,397	29,901	1,458,487	181,201	120,558	53,918	476,268	58,388	965,546	66.2	492,941	425,535	328,825	316,666
	10 mos.	1,213	9,495,364	246,387	10,350,716	1,632,538	1,581,412	539,638	3,594,843	457,567	8,138,195	78.6	2,212,521	1,521,949	1,179,367	667,580
Wheeling & Lake Erie	Oct.	511	794,536	1,323	839,183	86,355	222,330	29,251	271,526	42,903	652,338	77.3	186,845	122,100	117,354	107,603
	10 mos.	511	8,904,268	15,207	9,486,111	950,069	2 839,399	284,465	2,868,659	324,199	7,265,280	76.6	2,220,831	1,419,772	1,286,965	1,592,927
Wichita Falls & Southern	Oct.	203	39,178	55	43,637	7,660	6,596	2,246	12,421	4,053	32,976	75.57	10,661	7,770	6,101	19,942
	10 mos.	203	388,202	487	439,411	88,872	65,574	17,652	127,623	35,562	335,283	76.30	104,128	74,539	47,727	69,417